

حمل الآن

مجانا وحصريا

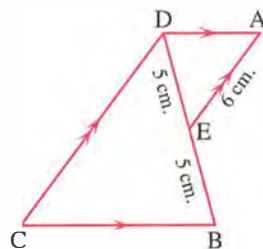
# امتحانات رقم (1)

## الترم الاول

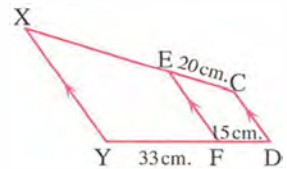
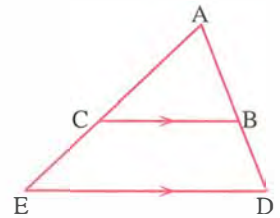


**First Multiple choice questions**Interactive  
tests ①**Choose the correct answer from those given :**

- (1) The conjugate of the number :  $3i - 5$  is .....
- (a)  $3i + 5$  (b)  $-(3i + 5)$  (c)  $5 - 3i$  (d)  $-(5 - 3i)$
- (2) The angle whose measure :  $-120^\circ$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (3) If the polygon  $M_1$  is enlargement of polygon  $M_2$ , and  $K$  is the scale factor, then .....
- (a)  $K > 1$  (b)  $K < 1$  (c)  $K = 0$  (d)  $0 < K < 1$
- (4) All ..... are similar.
- (a) triangles (b) rectangles  
(c) squares (d) parallelograms
- (5) If  $X = 2$ , is one root of the equation :  $X^2 - kX - 6 = 0$ , then  $k = \dots\dots\dots$
- (a) 1 (b) -1 (c) 2 (d) zero
- (6) If the length of the radius of the circle  $\odot M$  is 9 cm. ,  $AM = 12$  cm. , then  $P_M(A) = \dots\dots\dots$
- (a) 144 (b) 81 (c) 63 (d) 225
- (7) The solution set of the inequality :  $X^2 + 3X - 4 \geq 0$  in  $\mathbb{R}$  is .....
- (a)  $\{-4, 1\}$  (b)  $[-4, 1]$   
(c)  $\mathbb{R} - ]-4, 1[$  (d)  $\mathbb{R} - [-4, 1]$
- (8) In the opposite figure :
- DC = ..... cm.
- (a) 6  
(b) 9  
(c) 12  
(d) 15
- (9) The quadratic equation whose roots are  $\frac{3}{2}i, \frac{3}{2}i^3$  is .....
- (a)  $4X^2 - 9 = 0$  (b)  $4X^2 + 9 = 0$   
(c)  $9X^2 - 4 = 0$  (d)  $9X^2 + 4 = 0$



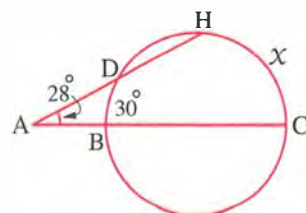
- (10) The length of the arc in a circle, its radius length is 6 cm., and its central angle of measure  $60^\circ$ , equals ..... cm.  
 (a)  $5\pi$  (b)  $4\pi$  (c)  $3\pi$  (d)  $2\pi$
- (11) The internal bisector of vertex angle of a triangle is ..... the external bisector of it.  
 (a) parallel to (b) equal to  
 (c) perpendicular to (d) coincident with
- (12) Which measure of the following angles whose sine and cosine are negative together?  
 (a)  $30^\circ$  (b)  $120^\circ$  (c)  $220^\circ$  (d)  $320^\circ$
- (13) If two similar polygons, the ratio between their perimeters =  $4 : 9$ , then the ratio between their areas = .....  
 (a)  $4 : 9$  (b)  $9 : 4$  (c)  $2 : 3$  (d)  $16 : 81$
- (14) If  $\sin(2X + 15^\circ) = \cos(3X + 25^\circ)$ , where  $X \in ]0, \frac{\pi}{4}[$ , then the value of  $X =$  .....  
 (a)  $10^\circ$  (b)  $50^\circ$  (c)  $25^\circ$  (d)  $30^\circ$
- (15) If the product of roots of the equation :  $X^2 - 3X + k = 0$  is 1, then  $k =$  .....  
 (a)  $-2$  (b)  $-1$  (c)  $1$  (d)  $2$
- (16) In the opposite figure :  
 If  $\overline{BC} \parallel \overline{DE}$ , then .....  
 (a) BCED is cyclic quadrilateral.  
 (b)  $\triangle ABC \sim \triangle ADE$   
 (c)  $AB \times AD = AC \times AE$   
 (d)  $AB : BD = BC : DE$
- (17) In the opposite figure :  
 Length of  $\overline{XC} =$  ..... cm.  
 (a) 48 (b) 64  
 (c) 44 (d) 21
- (18)  $\tan X + \tan(180^\circ - X) =$  .....  
 (a) 0 (b) 1 (c)  $-1$  (d)  $2 \tan X$
- (19) If two similar rectangles, their widths are 6 cm., 3 cm. respectively, then the ratio between their perimeters = ..... respectively.  
 (a)  $2 : 3$  (b)  $3 : 2$  (c)  $1 : 2$  (d)  $2 : 1$
- (20) If the roots of the equation :  $X^2 + 4X + k = 0$ , are different and real, then  $k \in$  .....  
 (a)  $]-\infty, 4[$  (b)  $]4, \infty[$  (c)  $]-\infty, 4]$  (d)  $\{4\}$



**(21) In the opposite figure :**

$x = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $60^\circ$   
(c)  $86^\circ$  (d)  $26^\circ$



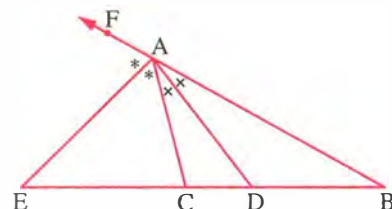
**(22) If  $2 + 3i + (1 - i) = x + iy$ , then  $x + y = \dots\dots\dots$**

- (a) 2 (b) -4 (c) 5 (d) 7

**(23) Using the opposite figure :**

The false statement of the following is  $\dots\dots\dots$

- (a)  $\frac{BA}{AC} = \frac{BD}{DC}$  (b)  $\frac{BA}{AC} = \frac{BE}{EC}$   
(c)  $\frac{CA}{AB} = \frac{DA}{AE}$  (d)  $\angle DAE$  is right.



**(24) The sign of the function  $f(x) = x - 2$  is negative if  $\dots\dots\dots$**

- (a)  $x > 2$  (b)  $x \geq 2$  (c)  $x \leq 2$  (d)  $x < 2$

**(25) If  $13 \sin(90^\circ - \theta) = 5$ , then  $\cos \theta = \dots\dots\dots$**

- (a)  $\frac{12}{13}$  (b)  $\frac{5}{13}$  (c)  $-\frac{12}{13}$  (d)  $-\frac{5}{13}$

**(26) The triangle in which two angles of measures  $60^\circ$ ,  $75^\circ$  is similar to the triangle in which two angles of measures  $45^\circ$ ,  $\dots\dots\dots$**

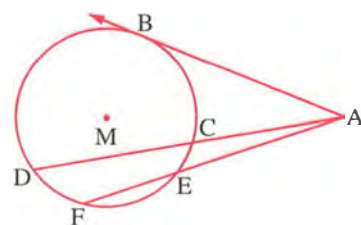
- (a)  $30^\circ$  (b)  $55^\circ$  (c)  $75^\circ$  (d)  $100^\circ$

**(27) In the opposite figure :**

If  $\overrightarrow{AB}$  is a tangent to the circle M

, then  $(AB)^2 = \dots\dots\dots$

- (a)  $AC \times CD$  (b)  $AE \times EF$   
(c)  $P_M(A)$  (d)  $\frac{AC}{AD}$



**Second Essay questions**

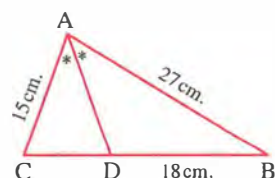
**Answer the following questions :**

**1 Find the solution set in  $\mathbb{R}$  for the inequality :  $x^2 + 5x - 6 \geq 0$**

**2 In the opposite figure :**

$\overrightarrow{AD}$  bisects  $\angle BAC$

Calculate the length of :  $\overline{AD}$



2

Cairo Governorate



El-Zaitoun Directorate  
Mathematics Supervision

**First Multiple choice questions**



Interactive  
tests ②

**Choose the correct answer from those given :**

- (1) Number of roots of the equation :  $x^2 + 9 = 0$  in  $\mathbb{R}$  is .....
- (a) 2 (b) 1 (c) 3 (d) zero
- (2) If  $\Delta ABC \sim \Delta DEF$  ,  $BC = 3 EF$  , then the scale factor of similarity of the two triangles = .....
- (a)  $\frac{2}{3}$  (b)  $\frac{1}{2}$  (c) 1 (d) 3
- (3) The angle of measure  $585^\circ$  in standard position is equivalent to the angle of measure .....
- (a)  $45^\circ$  (b)  $135^\circ$  (c)  $225^\circ$  (d)  $315^\circ$
- (4) The simplest form of imaginary number  $i^{45}$  is .....
- (a)  $-1$  (b) 1 (c)  $-i$  (d)  $i$
- (5) Two angles of a triangle with measures  $50^\circ$  ,  $70^\circ$  similar to another triangle with angles of measures  $50^\circ$  and ..... $^\circ$
- (a) 60 (b) 80 (c) 55 (d) 40
- (6) The ratio between two corresponding sides of two similar squares is  $3 : 4$  , if the area of the greater square is  $48 \text{ cm}^2$  , then the area of smaller one = .....  $\text{cm}^2$
- (a) 16 (b) 12 (c) 20 (d) 27
- (7) The conjugate of the number  $(-8)$  is .....
- (a)  $8i$  (b)  $-8i$  (c)  $-8$  (d) 8
- (8) If the two roots of the equation :  $3x^2 - 6x + k = 0$  are equal real , then  $k = \dots\dots\dots$
- (a) 2 (b) 3 (c) 6 (d) 9
- (9) If  $M$  is a circle of radius length 3 cm. ,  $A$  is a point lies in its plane where  $MA = 4$  cm. , then  $P_M(A) = \dots\dots\dots$
- (a)  $\sqrt{7}$  (b) 9 (c) 7 (d)  $-7$
- (10) The angle of measure  $\frac{9\pi}{4}$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (11) Two similar polygons , the length of two corresponding sides are 7 cm. , 11 cm. , then the ratio between their two perimeters is .....
- (a)  $\frac{49}{121}$  (b)  $\frac{7}{18}$  (c)  $\frac{7}{11}$  (d)  $\frac{11}{18}$

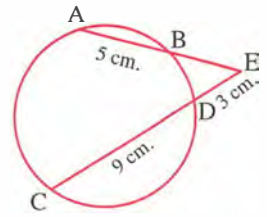
(12) If  $\cos \theta = \frac{1}{2}$ ,  $\sin \theta = \frac{\sqrt{3}}{2}$ , then the measure of angle  $\theta = \dots\dots\dots$

- (a)  $\frac{\pi}{3}$  (b)  $\frac{5\pi}{6}$  (c)  $\frac{5\pi}{3}$  (d)  $\frac{11\pi}{6}$

(13) In the opposite figure :

BE = ..... cm.

- (a) 6 (b) 5  
(c) 4 (d) 3



(14) The sum of the two roots of the equation :  $5x^2 - 3 = 0$  is .....

- (a)  $\frac{3}{5}$  (b)  $-\frac{3}{5}$  (c) zero (d)  $\frac{5}{3}$

(15) If one of the two roots of the equation :  $3x^2 - (b-3)x + 5 = 0$  is the additive inverse of the other, then b = ..... cm.

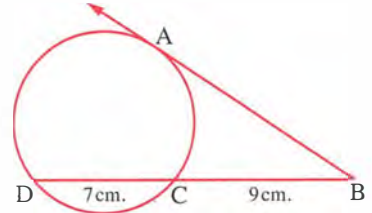
- (a) -5 (b) -3 (c) 3 (d) 5

(16) In the opposite figure :

$\overrightarrow{BA}$  is a tangent, BC = 9 cm., CD = 7 cm.

, then AB = ..... cm.

- (a) 63 (b) 144  
(c) 12 (d)  $\frac{9}{16}$



(17) If M is a circle, A is a point lies in its plane where  $P_M(A) = 0$ , then A lies .....

- (a) inside the circle. (b) on the centre of the circle.  
(c) outside the circle. (d) on the circle.

(18) If  $X$  is the measure of one angle in right-angled triangle,  $\sin X = \frac{4}{5}$ , then  $\cos(90^\circ - X) = \dots\dots\dots$

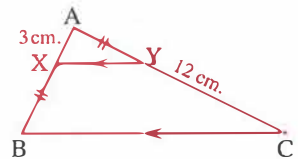
- (a)  $\frac{3}{5}$  (b)  $-\frac{3}{5}$  (c)  $-\frac{4}{5}$  (d)  $\frac{4}{5}$

(19) In the opposite figure :

If  $\overline{XY} \parallel \overline{BC}$

, then AC = ..... cm.

- (a) 15 (b) 16  
(c) 18 (d) 20



(20) The two similar polygons are congruent if the scale factor K satisfies .....

- (a)  $K = \frac{1}{2}$  (b)  $K = 1$  (c)  $K > 1$  (d)  $0 < K < 1$

(21) The quadratic equation whose roots are  $-2i$  and  $2i$  is .....

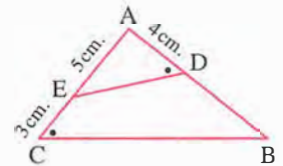
- (a)  $x^2 = 4i$  (b)  $x^2 + 4 = 0$   
(c)  $x^2 - 4 = 0$  (d)  $ix^2 + 4 = 0$

- (22) If  $L, M$  are the two roots of the equation :  $x^2 - 7x + 3 = 0$  , then the value of the expression :  $L^2 M + L M^2 = \dots\dots\dots$
- (a) 7 (b) 3 (c) 10 (d) 21
- (23) Two similar polygons , the ratio between their perimeters equal  $4 : 9$  , then the ratio between the lengths of two corresponding sides is  $\dots\dots\dots$
- (a)  $4 : 9$  (b)  $2 : 3$  (c)  $16 : 81$  (d)  $9 : 4$

(24) In the opposite figure :

$BD = \dots\dots\dots$  cm.

- (a) 5 (b) 6  
(c) 4 (d) 7



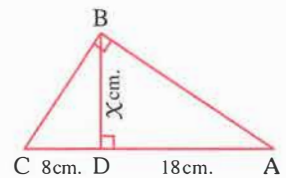
(25) If  $XYZL$  is a cyclic quadrilateral ,  $\cos X = \frac{1}{2}$  , then  $\sin (270^\circ - Z) = \dots\dots\dots$

- (a)  $\frac{\sqrt{3}}{2}$  (b)  $-\frac{\sqrt{3}}{2}$  (c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$

(26) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a)  $12\sqrt{3}$  (b) 24  
(c) 12 (d)  $8\sqrt{3}$



(27) The S.S. of the inequality  $(x - 1)^2 \leq 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\mathbb{R}$  (b)  $\emptyset$  (c)  $\{1\}$  (d)  $\mathbb{R} - \{1\}$

## Second Essay questions

Answer the following questions :

1 Determine the sign of the function , then represent your answer on number line :

$$f(x) = x^2 + 2x - 3$$

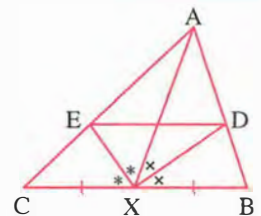
2 In the opposite figure :

$ABC$  is a triangle  $X$  is midpoint of  $\overline{BC}$

,  $\overrightarrow{XE}$  bisect  $\angle AXC$

,  $\overrightarrow{XD}$  bisect  $\angle AXB$

Prove that :  $\overline{ED} \parallel \overline{CB}$





**First Multiple choice questions**



Interactive  
tests ③

**Choose the correct answer from those given :**

(1) If  $4 \cos \theta = 3$  where  $\theta$  is an acute angle , then  $\tan (-\theta) = \dots\dots\dots$

(a)  $\frac{3}{4}$

(b)  $\frac{-\sqrt{7}}{4}$

(c)  $\frac{-3}{4}$

(d)  $\frac{-\sqrt{7}}{3}$

(2) The length of the arc of a circle its diameter length 24 cm. and opposite to a central angle its measure  $60^\circ$  is  $\dots\dots\dots$

(a)  $2\pi$

(b)  $3\pi$

(c)  $4\pi$

(d)  $8\pi$

(3) If the two roots of the equation :  $X^2 - 4X + k - 2 = 0$  are equal , then  $k = \dots\dots\dots$

(a) 5

(b) 6

(c) 4

(d) 8

(4) The conjugate of the number  $3i + 5$  is  $\dots\dots\dots$

(a)  $3i + 5$

(b)  $3i - 5$

(c)  $-3i - 5$

(d)  $5 - 3i$

(5) The solution set of :  $5 - 4X \geq X^2$  in  $\mathbb{R}$  is  $\dots\dots\dots$

(a)  $[-5, 1]$

(b)  $] -5, 1[$

(c)  $\mathbb{R} - ] -5, 1[$

(d)  $\mathbb{R} - [-5, 1]$

(6) In the opposite figure :

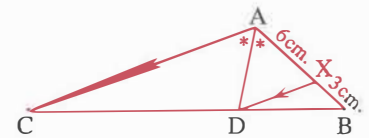
$\overrightarrow{AD}$  bisects  $\angle A$  ,  $\overrightarrow{DX} \parallel \overrightarrow{AC}$   
 , then  $AC = \dots\dots\dots$  cm.

(a) 12

(b) 18

(c) 8

(d) 15



(7) If  $\tan (3\theta - 70^\circ) \times \tan \theta = 1$  where  $\theta \in ]0, \frac{\pi}{3}[$  , then  $\sin (2\theta + 10) = \dots\dots\dots$

(a) 1

(b) -1

(c) zero

(d)  $\emptyset$

(8) If  $L$  is one of the two roots of the equation :  $X^2 - 3X + 1 = \text{zero}$   
 , then  $3L - L^2 + 5 = \dots\dots\dots$

(a) 1

(b) 6

(c) 4

(d) -6

(9) In the opposite figure :

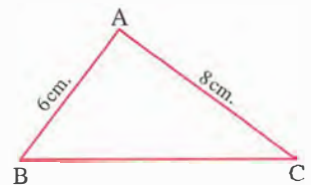
$m(\angle A) = 2m(\angle B)$   
 , then  $BC = \dots\dots\dots$  cm.

(a)  $3\sqrt{3}$

(b)  $2\sqrt{21}$

(c)  $4\sqrt{7}$

(d) 10



**(10) In the opposite figure :**

$m(\angle AED) = m(\angle B)$  ,  $AD = 4$  cm.

,  $DB = 6$  cm. ,  $CE = 3$  cm.

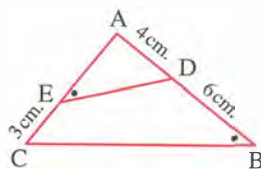
, then  $AE = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 5

(d) 6



**(11) The sign of function  $f(x) = 8 - 2x$  is positive when .....**

(a)  $x > 4$

(b)  $x < 4$

(c)  $x \geq 4$

(d)  $x \leq 4$

**(12) Two similar triangles , the area of the first  $50 \text{ cm}^2$  , the area of the second  $32 \text{ cm}^2$  and the perimeter of the smaller is 16 cm. , then the perimeter of the greater = .....**

(a) 25

(b) 30

(c) 15

(d) 20

**(13) In the opposite figure :**

$AB = 15$  cm. ,  $AC = 9$  cm. ,  $DC = 6$  cm.

and  $\overrightarrow{AD}$  bisect  $(\angle BAC)$

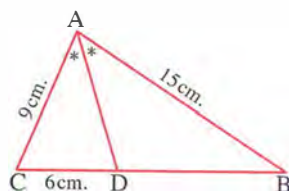
, then  $AD = \dots\dots\dots$  cm.

(a)  $5\sqrt{5}$

(b)  $3\sqrt{5}$

(c) 13.5

(d)  $5\sqrt{3}$



**(14) In the opposite figure :**

$\overrightarrow{AB}$  ,  $\overrightarrow{AC}$  are two tangents of the circle

,  $m(\widehat{BC}) = 110^\circ$

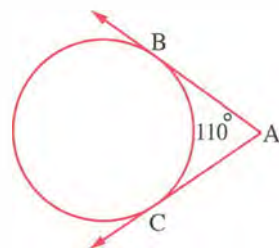
, then  $m(\angle A) = \dots\dots\dots$

(a)  $70^\circ$

(b)  $55^\circ$

(c)  $60^\circ$

(d)  $75^\circ$



**(15) M is circle its radius length is 3 cm. , A is a point outside it where  $AM = 4$  cm.**

, then  $P_M(A) = \dots\dots\dots$

(a) 5

(b) 7

(c) 25

(d) 1

**(16) In the opposite figure :**

$\Delta ABC$  is right-angled triangle at B

,  $\overline{BD} \perp \overline{AC}$

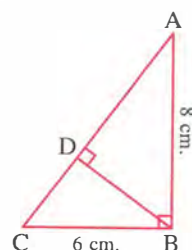
, then  $AD = \dots\dots\dots$  cm.

(a) 5

(b) 3.6

(c) 6.4

(d)  $5\frac{5}{7}$



**(17) If  $\Delta ABC \sim \Delta XYZ$  ,  $m(\angle A) = 60^\circ$  ,  $m(\angle Y) = 70^\circ$  , then  $m(\angle C) = \dots\dots\dots^\circ$**

(a) 120

(b) 50

(c) 70

(d) 110

(18)  $\tan (135^\circ) \sec (240^\circ) = \dots\dots\dots$  in simplest form.

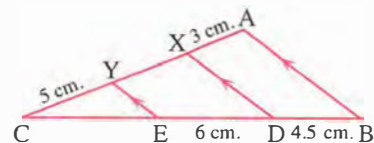
- (a)  $\frac{1}{2}$  (b)  $-\frac{1}{2}$  (c)  $-2$  (d)  $2$

(19) In the opposite figure :

$$\overline{AB} \parallel \overline{XD} \parallel \overline{YE}$$

, then  $XY + EC = \dots\dots\dots$  cm.

- (a) 11.5 (b) 10  
(c) 11 (d) 12



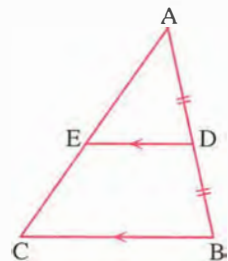
(20) In the opposite figure :

If D is the midpoint of  $\overline{AB}$

, area of  $\triangle ADE = 16 \text{ cm}^2$

, then the area of  $\triangle ABC = \dots\dots\dots \text{ cm}^2$

- (a) 32 (b) 48  
(c) 64 (d) 50



(21) The maximum value of the function :  $f(x) = 1 - 3 \cos 2x$  is  $\dots\dots\dots$

- (a) 3 (b)  $-2$  (c) 4 (d) 2

(22) In the opposite figure :

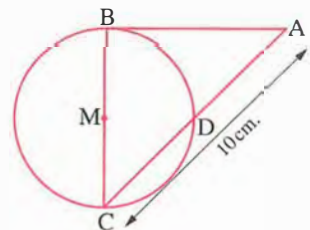
$\overline{AB}$  is a tangent of the circle at B

,  $\overline{BC}$  is the diameter ,  $BC = 8 \text{ cm}$ .

,  $AC = 10 \text{ cm}$ .

, then the length of  $\overline{AD} = \dots\dots\dots \text{ cm}$ .

- (a) 3.6 (b) 6.4 (c) 4.8 (d) 5



(23) The equation which its two roots are :  $1 + i$  ,  $1 + i^3$  , where  $i^2 = -1$  is  $\dots\dots\dots$

- (a)  $x^2 + 2x + 2 = 0$  (b)  $x^2 - 2x + 2 = 0$   
(c)  $x^2 + 2x - 2 = 0$  (d)  $x^2 - 2x - 2 = 0$

(24) If  $\frac{2}{L}$  ,  $\frac{2}{M}$  are the two roots of the equation :  $4x^2 - 3x - 2 = 0$  , then  $L + M = \dots\dots\dots$

- (a)  $-3$  (b)  $3$  (c)  $-8$  (d)  $-\frac{3}{4}$

(25) The simplest form of  $\sin (270^\circ - \theta) + \cos (360^\circ - \theta) = \dots\dots\dots$

- (a)  $2 \cos \theta$  (b)  $-2 \cos \theta$  (c)  $-1$  (d) zero

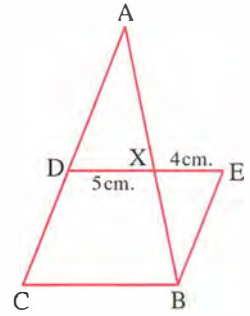
(26) The angle which its measure is  $-\frac{8\pi}{3}$  lies in the  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

**(27) In the opposite figure :**

EBCD is a rhombus such that :  
 $EX = 4$  cm. ,  $XD = 5$  cm.  
 , then the length of  $\overline{AD} = \dots\dots\dots$  cm.

- (a) 9 (b) 10.5  
 (c) 11.25 (d) 14

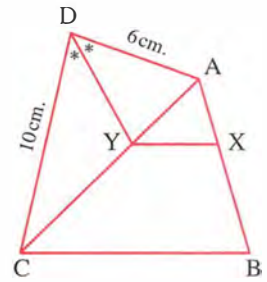


**Second Essay questions**

**Answer the following questions :**

**1 In the opposite figure :**

$\overrightarrow{DY}$  bisects  $\angle ADC$   
 and  $AX : XB = 3 : 5$   
**Prove that :**  $\overline{XY} \parallel \overline{BC}$



- 2** Determine the sign of the function  $f(x) = x^2 - 10x + 21$  , then find in  $\mathbb{R}$  the solution set of the inequality  $f(x) < \text{zero}$

**4**

**Giza Governorate**



**Awsseem Educational Directorate  
 Mathematics Inspection**

**First Multiple choice questions**

**Choose the correct answer from those given :**

- (1)** If  $x = 2 - 3i$  ,  $y = -1 + 3i$  , then the value of the expression :  
 $x^2 + 2xy + y^2 = \dots\dots\dots$   
 (a) 9 (b) -1 (c) 1 (d) 5
- (2)** If the two roots of the equation :  $x^2 - 4x + 3 + \frac{1}{m} = 0$  are equal , then  $m = \dots\dots\dots$   
 (a) 3 (b) 1 (c) 4 (d)  $\frac{4}{3}$
- (3)** If one root of the equation :  $(x - k)^2 - 6x = 0$  is the additive inverse of the other , then  $k = \dots\dots\dots$   
 (a) -3 (b) 6 (c) -6 (d) 9
- (4)** If  $L$  is one root of the equation :  $x^2 - 3x + 5 = 0$  , then the value of the expression :  
 $2L^2 - 6L + 15 = \dots\dots\dots$   
 (a) 3 (b) 5 (c) 15 (d) 10



**Interactive  
 tests ④**

- (5) If  $L, M$  are the two roots of the equation :  $(X - a)(X - b) = k$ , then the equation whose roots are  $a, b$  is .....
- (a)  $(X - L)(X - M) = 0$  (b)  $(X - L)(X - M) + k = 0$   
 (c)  $X^2 - (L + M)X + k = 0$  (d)  $(X - L)(X - M) = k$
- (6) If the S.S. of the inequality :  $X^2 - 4 \leq X + k$  is  $[-2, 3]$ , then  $k = \dots\dots\dots$
- (a)  $-6$  (b)  $1$  (c)  $2$  (d)  $10$
- (7) If  $f(X) = X - 2$ ,  $g(X) = X^2 - 5X - 6$ , then the two functions are positive together at the same time in the interval .....
- (a)  $]6, \infty[$  (b)  $]2, 6[$  (c)  $]-2, -\infty[$  (d)  $[2, 6]$
- (8) If  $L, M$  are the two roots of the equation :  $X^2 - 5X + 7 = 0$ , then the value of the expression :  $L^2M + LM^2 = \dots\dots\dots$
- (a)  $25$  (b)  $12$  (c)  $35$  (d)  $40$
- (9) The radian and degree measure of the central angle opposite to an arc of length  $3$  cm. in a circle of surface area  $16\pi \text{ cm}^2$  equals .....
- (a)  $1^{\text{rad}}$  and  $180^\circ$  (b)  $1.5^{\text{rad}}$  and  $86^\circ$   
 (c)  $0.75^{\text{rad}}$  and  $90^\circ$  (d)  $0.75^{\text{rad}}$  and  $42^\circ 58'$
- (10) If  $(10X - 15)^\circ$  is the smallest positive measure,  $(10Y - 15)^\circ$  is the greatest negative measure of two equivalent angles, then  $X - Y = \dots\dots\dots$
- (a)  $36$  (b)  $120$  (c)  $90$  (d)  $60$
- (11) If  $10 \sin \theta = 6$  where  $\theta$  is the measure of the greatest positive angle, then the numerical value of the expression :  $\sec(540^\circ + \theta) = \dots\dots\dots$
- (a)  $\frac{3}{5}$  (b)  $-\frac{5}{4}$  (c)  $\frac{5}{4}$  (d)  $-\frac{3}{5}$
- (12) If  $\tan(180^\circ + 5\theta) + \tan(270^\circ + 4\theta) = 0$ , then one value of  $\theta$  which satisfy the equation where  $\theta \in ]0, 90^\circ[$  equals .....
- (a)  $5$  (b)  $10$  (c)  $20$  (d)  $90$
- (13) If  $f(\theta) = 2 \sin 4\theta$  is a periodic function and its period equals .....
- (a)  $2\pi$  (b)  $\pi$  (c)  $\frac{\pi}{2}$  (d)  $\frac{\pi}{4}$
- (14) If  $\sin \theta = \frac{4}{5}$  where  $\theta$  is the greatest positive angle, then the value of the expression :  $\sin(180^\circ - \theta) + \tan(360^\circ - \theta) + 2 \sin(270^\circ - \theta) = \dots\dots\dots$
- (a)  $\frac{41}{15}$  (b)  $\frac{13}{5}$  (c)  $\frac{10}{3}$  (d)  $15$
- (15) The ratio between the lengths of two corresponding sides in two similar polygons is  $2 : 3$  if the perimeter of the smaller is  $14$  cm., then the perimeter of the greater = ..... cm.
- (a)  $14$  (b)  $15$  (c)  $21$  (d)  $28$

(16) A is a point in the plane of circle M ,  $MA = 6$  cm. ,  $P_M(A) = -13$  , then the surface area of the circle = .....  $\text{cm}^2$  , (where  $\pi = \frac{22}{7}$ )

- (a) 7 (b) 44 (c) 154 (d) 144

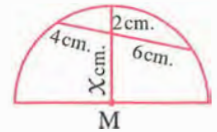
(17) The sum of areas of two similar polygons is  $250 \text{ cm}^2$  and the ratio between their perimeters is  $4 : 3$  , then the surface area of the greater polygon = .....  $\text{cm}^2$

- (a) 160 (b) 144 (c) 150 (d) 155

(18) In the opposite figure :

A semicircle of centre M  
 , then  $X = \dots\dots\dots \text{cm}$ .

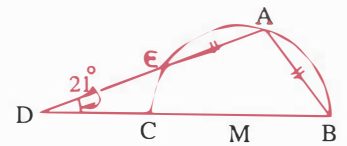
- (a) 5 (b) 7 (c) 8 (d) 12



(19) In the opposite figure :

If  $AE = AB$  ,  $\overline{BC}$  is a diameter ,  $m(\angle D) = 21^\circ$   
 , then  $m(\angle A) = \dots\dots\dots$

- (a)  $100^\circ$  (b)  $104^\circ$  (c)  $106^\circ$  (d)  $110^\circ$



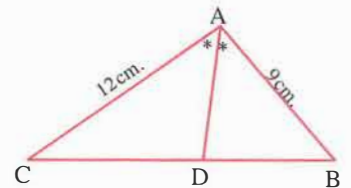
(20)  $\triangle ABC \sim \triangle DEF$  , area of  $(\triangle ABC) = 4$  area of  $(\triangle DEF)$  and if  $DE = 6$  cm.  
 , then  $AB = \dots\dots\dots$

- (a) 3 (b) 24 (c) 12 (d) 8

(21) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle BAC$   
 , then  $\frac{\text{area of } (\triangle ABD)}{\text{area of } (\triangle ADC)} = \dots\dots\dots$

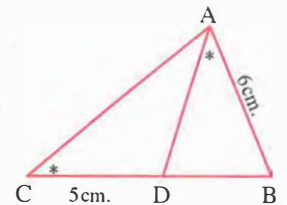
- (a)  $3 : 7$  (b)  $3 : 4$  (c)  $81 : 144$  (d)  $9 : 49$



(22) In the opposite figure :

$m(\angle BAD) = m(\angle C)$   
 , then  $BD = \dots\dots\dots \text{cm}$ .

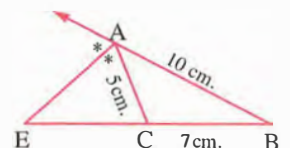
- (a) 3 (b) 5 (c) 4 (d) 6



(23) In the opposite figure :

$\overrightarrow{AE}$  bisects the exterior angle at A  
 , then  $BE = \dots\dots\dots \text{cm}$ .

- (a) 7 (b) 14 (c) 8 (d) 21



**(24) In the opposite figure :**

$$\overline{DE} \parallel \overline{BC}, \overline{DC} \parallel \overline{BF}$$

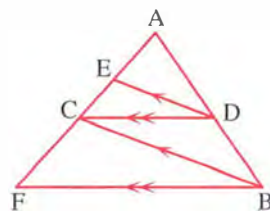
, then  $AE \times AF = \dots\dots\dots$

(a)  $AD \times AB$

(c)  $(AE)^2$

(b)  $(AC)^2$

(d)  $AC \times AB$



**(25) In the opposite figure :**

$$\overline{AE} \text{ bisects } \angle BAD, \overline{FE} \parallel \overline{CB}$$

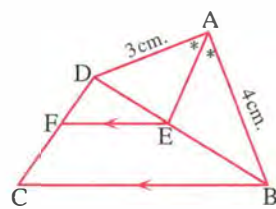
, then  $\frac{DF}{FC} = \dots\dots\dots$

(a)  $\frac{4}{3}$

(c)  $\frac{9}{16}$

(b)  $\frac{3}{4}$

(d)  $\frac{16}{9}$



**(26) In the opposite figure :**

$$\overline{AD} \parallel \overline{EF} \parallel \overline{BC}, \frac{AE}{EB} = \frac{2}{3}$$

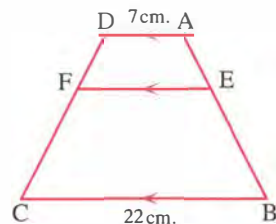
, then  $EF = \dots\dots\dots$  cm.

(a) 9

(c) 13

(b) 11

(d) 15



**(27) The interior and exterior bisectors at a vertex of an angle of a triangle are .....**

(a) parallel.

(b) bisect each other.

(c) perpendicular.

(d) congruent.

**Second**

**Essay questions**

**Answer the following questions :**

**1** If  $L - 3$  ,  $M - 3$  are the two roots of the equation :  $x^2 - 7x - 10 = 0$

, then form the equation whose roots are :  $\frac{1}{L}$  ,  $\frac{1}{M}$

**2** ABC is a triangle in which  $AB > AC$  ,  $D \in \overline{AB}$  such that :  $BD = AC$  ,  $\overline{AE}$  is drawn to bisect  $\angle BAC$  to cut  $\overline{DC}$  at E , then  $\overline{EF} \parallel \overline{BA}$  to cut  $\overline{AC}$  at F

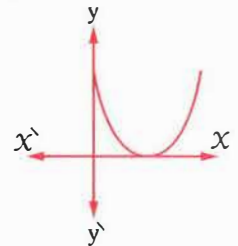
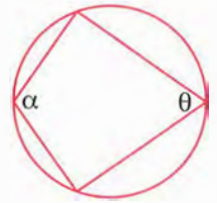
**Prove that :  $\overline{DF} \parallel \overline{BC}$**


**First Multiple choice questions**


Interactive tests ⑤

**Choose the correct answer from those given :**

- (1) The angle in the standard position whose measure is  $-285^\circ$  lie in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (2) The range of the function  $f(x) = 2 \cos 3x$  equals .....
- (a)  $[-2, 2]$  (b)  $[-3, 3]$  (c)  $[0, 2]$  (d)  $[-2, 0]$
- (3) The simplest form of the expression :  $\cos(180^\circ + \theta) + \sin(90^\circ + \theta) = \dots\dots\dots$
- (a) 0 (b) 2 (c)  $2 \cos \theta$  (d)  $2 \sin \theta$
- (4) If  $\sin(\theta + 13) = \cos(\theta + 17)$ , where  $\theta$  is positive acute angle, then  $\tan \theta = \dots\dots\dots$
- (a)  $\sqrt{3}$  (b)  $\frac{1}{2}$  (c)  $\frac{1}{\sqrt{3}}$  (d)  $\frac{\sqrt{3}}{2}$
- (5) In the opposite figure :
- If  $5 \cos \theta = 3$ , then  $\tan \alpha = \dots\dots\dots$
- (a)  $\frac{3}{4}$  (b)  $-\frac{3}{4}$   
(c)  $\frac{3}{5}$  (d)  $-\frac{4}{3}$
- (6) If the terminal side of a positive angle in standard position intersects the unit circle at the point  $(\frac{\sqrt{3}}{2}, y)$ , where  $0 < \theta < 90^\circ$ , then  $\cot \theta = \dots\dots\dots$
- (a)  $\sqrt{3}$  (b)  $-\sqrt{3}$  (c)  $2\sqrt{3}$  (d)  $\frac{-1}{\sqrt{3}}$
- (7) If  $L, \frac{4}{L}$  are the two roots of the equation :  $x^2 + 7x + k = 0$ , then  $k = \dots\dots\dots$
- (a) 4 (b) 7 (c) -7 (d) 6
- (8) The opposite figure represents the curve of the function  $f(x) = ax^2 + 2x + c$ , then  $a \cdot c = \dots\dots\dots$
- (a) -1 (b) -4  
(c) 4 (d) 1
- (9) If the two roots of the equation :  $mx^2 - 12x + 9 = 0$  are equal then  $m = \dots\dots\dots$
- (a) 9 (b) 4 (c) 16 (d) 2
- (10) The sign of the function  $f(x) = 4 - 2x$  is not negative in the interval .....
- (a)  $[2, \infty[$  (b)  $]2, \infty[$  (c)  $]-\infty, 2[$  (d)  $]-\infty, 2]$



(11)  $(12i^{20} - 5i^{33}) - (7 - \sqrt{-81}) = \dots\dots\dots$

- (a)  $5 - 4i$  (b)  $5 + 4i$  (c)  $-5 + 4i$  (d)  $-5 - 4i$

(12) If  $a, b, c, d$  four consecutive positive integers, then  $i^a + i^b + i^c + i^d = \dots\dots\dots$

- (a) zero (b)  $-1$  (c)  $1$  (d)  $i$

(13) If one of the two roots of the equation:  $3x^2 + (a+3)x + 7 = 0$  is the additive inverse of the other, then  $a = \dots\dots\dots$

- (a)  $-3$  (b)  $3$  (c)  $\frac{1}{3}$  (d)  $-\frac{1}{3}$

(14) The solution set of the inequality:  $-x(x+2) \geq 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $[-2, 0]$  (b)  $] -2, 0[$  (c)  $\{-2, 0\}$  (d)  $[-2, 2]$

(15) In the opposite figure :

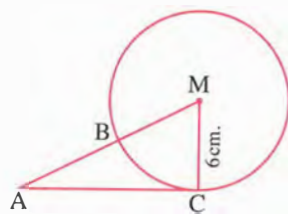
$\overline{AC}$  is tangent to circle M

,  $MC = 6$  cm.

,  $P_M(A) = 64$

, then  $AB = \dots\dots\dots$  cm.

- (a)  $3$  (b)  $4$  (c)  $5$  (d)  $6$



(16) In the opposite figure :

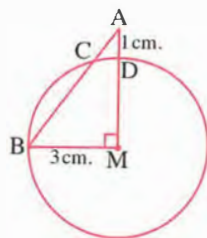
$\overline{MA} \perp \overline{MB}$  in circle M

its radius length =  $3$  cm.

,  $AM = 1$  cm.

, then  $BC = \dots\dots\dots$  cm.

- (a)  $3.6$  (b)  $1.4$  (c)  $5$  (d)  $3$

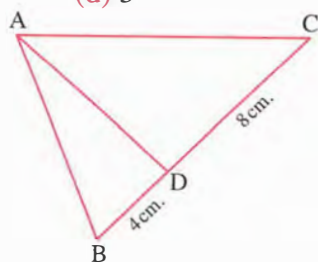


(17) In the opposite figure :

If  $m(\angle B) = 2m(\angle DAB) = 2m(\angle DAC)$

, then  $AB = \dots\dots\dots$  cm.

- (a)  $4$  (b)  $6$   
(c)  $8$  (d)  $9$



(18) If  $\triangle ABC \sim \triangle DEF$ ,  $BC = 3EF$ , then the factor of similarity of  $\triangle ABC$  to  $\triangle DEF$  equals  $\dots\dots\dots$

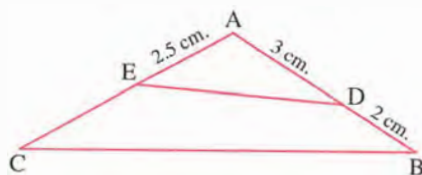
- (a)  $3$  (b)  $1$  (c)  $\frac{1}{3}$  (d)  $\frac{2}{3}$

(19) In the opposite figure :

$\triangle ABC \sim \triangle AED$

, then  $EC = \dots\dots\dots$  cm.

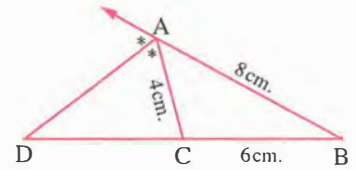
- (a)  $2.5$  (b)  $3$   
(c)  $3.5$  (d)  $4.5$



(20) In the opposite figure :

CD = ..... cm.

- (a) 2 (b) 4  
(c) 6 (d) 8



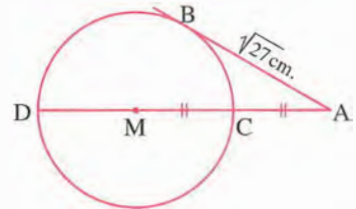
(21) Any two regular polygons of the same number of sides are .....

- (a) congruent. (b) equal in area.  
(c) equal in perimeter. (d) similar.

(22) In the opposite figure :

MC = CA, the radius length  
of the circle M = ..... cm.

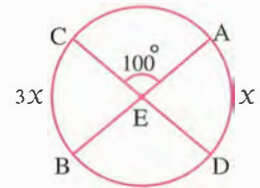
- (a) 2 (b) 3  
(c) 4 (d) 5



(23) In the opposite figure :

The value of  $x =$  .....

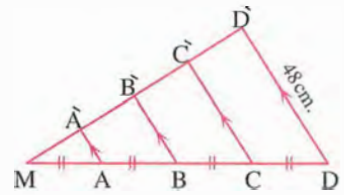
- (a)  $10^\circ$  (b)  $20^\circ$   
(c)  $30^\circ$  (d)  $40^\circ$



(24) In the opposite figure :

If  $DD = 48$  cm. , then  $BB =$  ..... cm.

- (a) 36 (b) 24  
(c) 16 (d) 12

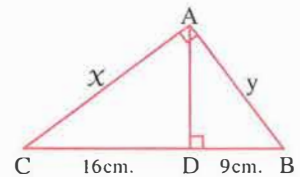


(25) In the opposite figure :

$m(\angle BAC) = 90^\circ$  ,  $\overline{AD} \perp \overline{BC}$

, then  $\frac{y}{x} =$  .....

- (a) 1 (b)  $\frac{4}{3}$   
(c)  $\frac{3}{4}$  (d) 2



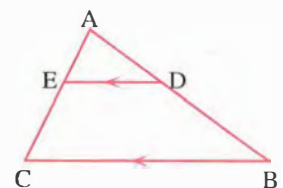
(26) In the opposite figure :

$\overline{DE} \parallel \overline{BC}$  where  $\frac{AD}{DB} = \frac{2}{3}$

and if the area of the trapezium DBCE =  $105 \text{ cm}^2$

, then the area of triangle ADE = .....  $\text{cm}^2$

- (a) 20 (b) 64 (c) 84 (d) 70



**(27) In the opposite figure :**

$\overline{AB} \parallel \overline{FE} \parallel \overline{CD}$  ,  $AE = FC$

,  $BF = 5$  cm. ,  $ED = 4$  cm.

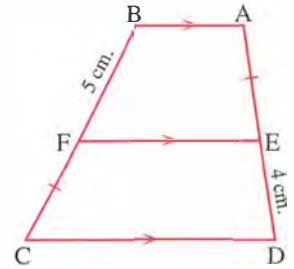
, then  $AE = \dots\dots\dots$  cm.

(a) 2

(b)  $5\sqrt{2}$

(c)  $2\sqrt{5}$

(d) 20



**Second**

**Essay questions**

**Answer the following questions :**

**1** If  $\frac{4}{L}$  ,  $\frac{4}{M}$  are the two roots of the equation :  $X^2 - 5X + 2 = 0$

, then find the quadratic equation whose roots are L , M

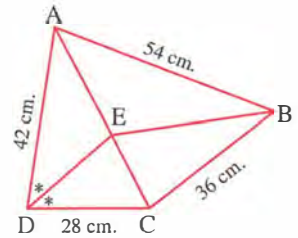
**2 In the opposite figure :**

$\overrightarrow{DE}$  bisects  $\angle ADC$  ,  $DA = 42$  cm.

,  $DC = 28$  cm. ,  $BC = 36$  cm.

,  $AB = 54$  cm.

**Prove that :**  $\overrightarrow{BE}$  bisects  $\angle ABC$



**6**

**Alexandria Governorate**



**Al Agamy Zone  
Math Inspection**

**First**

**Multiple choice questions**



**Interactive  
tests 6**

**Choose the correct answer from those given :**

**( 1 )** The maximum value of the function  $f (X) = \cos X$  equals 1 and happens when  $\theta = \dots\dots\dots$

(a)  $\pi$

(b)  $2n\pi$

(c)  $\pi + 2n\pi$

(d)  $\pi + n\pi$

**( 2 )** The solution set of the inequality :  $-X(X+3) \geq 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

(a)  $\{0, -3\}$

(b)  $]-3, 0[$

(c)  $[-3, 0[$

(d)  $[-3, 0]$

**( 3 )** If triangle  $ABC \sim$  triangle  $XYZ$  and  $2AB = 3XY$  , then the perimeter of triangle ABC : the perimeter of triangle XYZ =  $\dots\dots\dots$

(a) 4 : 9

(b) 9 : 4

(c) 2 : 3

(d) 3 : 2

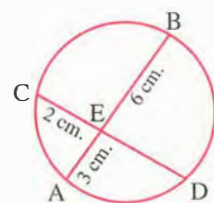
**( 4 ) In the opposite figure :**

If  $\overline{AB} \cap \overline{CD} = \{E\}$  ,  $AE = 3$  cm.

,  $CE = 2$  cm. ,  $BE = 6$  cm.

, then  $CD = \dots\dots\dots$  cm.

- (a) 9 (b) 8 (c) 11 (d) 6



**( 5 )** If the ratio between measures of the interior angles of a quadrilateral is  $5 : 4 : 9 : 6$  , then the measure of the smallest angle equals  $\dots\dots\dots$

- (a)  $\frac{\pi}{12}$  (b)  $\frac{\pi}{3}$  (c)  $\frac{5\pi}{12}$  (d)  $\frac{2\pi}{3}$

**( 6 )** If  $x + yi = \sqrt{-4 + i^{22}}$  , then  $x - y = \dots\dots\dots$

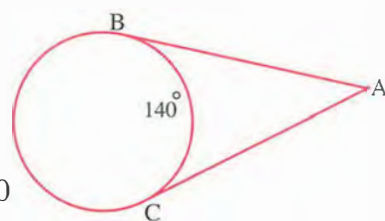
- (a) 3 (b) -3 (c) 2 (d) -2

**( 7 ) In the opposite figure :**

$\overline{AB}$  ,  $\overline{AC}$  are two tangents to the circle ,  $m(\widehat{BC}) = 140^\circ$

, then  $m(\angle A) = \dots\dots\dots^\circ$

- (a) 220 (b) 110  
(c) 40 (d) 180



**( 8 )** The radian measure of the sum of the angles of the regular pentagon =  $\dots\dots\dots$

- (a)  $\frac{1}{2} \pi$  (b)  $\frac{2}{5} \pi$  (c)  $2 \pi$  (d)  $3 \pi$

**( 9 )** In triangle ABC if  $\tan(A + B) = \frac{24}{7}$  , then  $\cos C = \dots\dots\dots$

- (a)  $\frac{24}{25}$  (b)  $-\frac{24}{25}$  (c)  $-\frac{7}{25}$  (d)  $\frac{7}{25}$

**(10)** If  $(2 - i)$  is one of the roots of the equation :  $x^2 - 4x + k = 0$  , then  $k = \dots\dots\dots$

- (a) 3 (b) -3 (c) 5 (d) -5

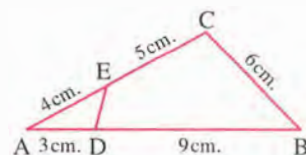
**(11) In the opposite figure :**

$E \in \overline{AC}$  ,  $D \in \overline{AB}$  where  $AD = 3$  cm. ,  $BD = 9$  cm.

,  $BC = 6$  cm. ,  $EC = 5$  cm. ,  $EA = 4$  cm.

, then the length of  $ED = \dots\dots\dots$  cm.

- (a) 3 (b) 2 (c) 6 (d) 5



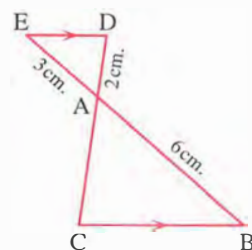
**(12) In the opposite figure :**

If  $\overline{ED} \parallel \overline{CB}$  ,  $\overline{DC} \cap \overline{BE} = \{A\}$

,  $AE = 3$  cm. ,  $AB = 6$  cm. ,  $AD = 2$  cm.

, then  $CD = \dots\dots\dots$  cm.

- (a) 6 (b) 4  
(c) 3 (d) 5



(13) If  $\sin \theta = \frac{3}{5}$  where  $90^\circ < \theta < 180^\circ$ , then  $\sin (180^\circ - \theta) + \cos (\theta - 90^\circ) = \dots\dots\dots$

- (a)  $\frac{4}{5}$  (b) 1 (c)  $\frac{6}{5}$  (d)  $-\frac{6}{5}$

(14) The function  $f$  where  $f(x) = x^2 + 2x - 3$  is negative at  $x \in \dots\dots\dots$

- (a)  $[-3, 1]$  (b)  $]-1, 3[$  (c)  $[-3, -1]$  (d)  $]-3, 1[$

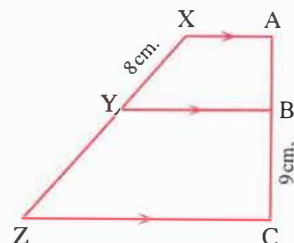
(15) In the opposite figure :

If  $\overline{AX} \parallel \overline{BY} \parallel \overline{CZ}$ ,  $YZ = 2AB$

,  $BC = 9$  cm. ,  $XY = 8$  cm.

, then  $AB = \dots\dots\dots$  cm.

- (a) 5 (b) 6  
(c) 10 (d) 4



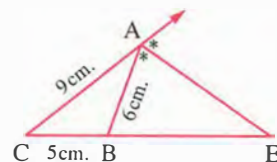
(16) In the opposite figure :

If  $BC = 5$  cm. ,  $CA = 9$  cm.

,  $\overline{AE}$  bisects the exterior angle at A

,  $AB = 6$  cm. , then  $BE = \dots\dots\dots$  cm.

- (a) 8 (b) 10 (c) 6 (d) 7



(17)  $\cos (180^\circ + \theta) + \sin (90^\circ + \theta) = \dots\dots\dots$

- (a)  $2 \sin \theta$  (b)  $2 \cos \theta$  (c) 2 (d) zero

(18) If the roots of the equation :  $x^2 + kx + 4 = 2x$  are real and equal , then  $k = \dots\dots\dots$

- (a) -2 (b) 6 (c) -2 or 6 (d) 2 or -6

(19) If  $a + bi = \frac{2+i}{2-i}$ , then  $a^2 + b^2 = \dots\dots\dots$

- (a) -i (b) -1 (c) 2 (d) 1

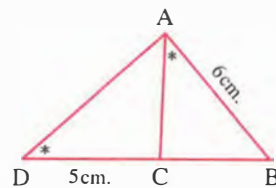
(20) In the opposite figure :

If  $m(\angle BAC) = m(\angle D)$

,  $AB = 6$  cm. ,  $DC = 5$  cm.

, then  $BC = \dots\dots\dots$  cm.

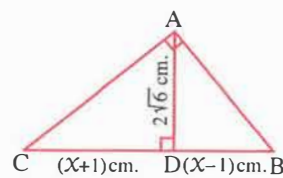
- (a) 4 (b) 6 (c) 9 (d) 10



(21) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a) 6 (b) 7  
(c) 5 (d) 8



(22) If the two roots of the equation :  $x^2 - 4x + k = 0$  are real , then  $k \in \dots\dots\dots$

- (a)  $]-\infty, 4[$  (b)  $]4, \infty[$  (c)  $]-\infty, 4]$  (d)  $[4, \infty[$

(23) If L and M are the two roots of the equation :  $x^2 - 5x + 6 = 0$  , then the equation whose roots are (L - M) and (M - L) is .....

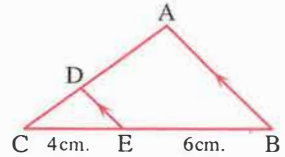
- (a)  $x^2 + 1 = 0$  (b)  $x^2 - 1 = 0$  (c)  $x^2 + 25 = 0$  (d)  $x^2 - x = 0$

(24) If  $\sin 8\theta \sec \theta = 1$  where  $\theta \in ]0, \frac{\pi}{15}[$  , then  $\tan 6\theta$  could equal .....

- (a) 1 (b)  $\frac{1}{2}$  (c)  $\sqrt{3}$  (d)  $\frac{\sqrt{3}}{3}$

(25) In the opposite figure :

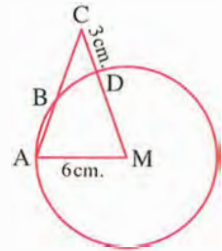
If  $\overline{ED} \parallel \overline{BA}$  ,  $BE = 6$  cm. ,  $EC = 4$  cm.  
 , the area of the figure ABED =  $42 \text{ cm}^2$   
 , then the area of  $\Delta CED = \dots\dots\dots \text{ cm}^2$



- (a) 16 (b) 10 (c) 8 (d) 20

(26) In the opposite figure :

If the length of the radius of a circle of center M is 6 cm.  
 ,  $CD = 3$  cm. ,  $m(\angle A) = m(\angle M)$   
 , then  $CB = \dots\dots\dots \text{ cm}$ .



- (a) 5 (b) 4  
 (c) 3 (d) 6

(27) If the ratio between the perimeters of two similar triangles is 1 : 4 , the area of the smaller is  $15 \text{ cm}^2$  , then the area of the bigger =  $\dots\dots\dots \text{ cm}^2$

- (a) 16 (b) 160 (c) 225 (d) 240

## Second Essay questions

Answer the following questions :

1 ABCD is a quadrilateral in which  $AB = AD$  ,  $\overline{AX}$  bisects  $\angle BAC$  and intersects  $\overline{BC}$  at X ,  
 $\overline{AY}$  bisects  $\angle DAC$  and intersects  $\overline{CD}$  at Y **Prove that :  $\overline{XY} \parallel \overline{BD}$**

2 If L , M are the roots of the equation :  $x^2 - 2x + 3 = 0$   
 form the equation of roots  $L^3 M$  ,  $L M^3$

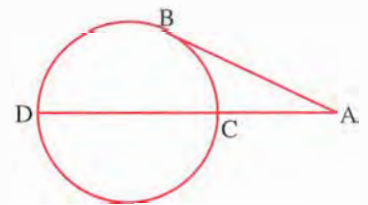
**First Multiple choice questions**Interactive  
tests **7****Choose the correct answer from those given :**

- (1) If  $X = i$  is one of two roots of the equation :  $X^2 - iX + k = 0$ , then  $k = \dots\dots\dots$
- (a) 0 (b) -1 (c) 4 (d) i
- (2)  $(2 + i)(2 - i)(1 + i)^2 = \dots\dots\dots$
- (a) 10 i (b) -10 + 10 i (c) 5 + i (d) -1 + 4 i
- (3) The function  $f(X) = -0.25X$  is negative at  $X \in \dots\dots\dots$
- (a)  $[0.25, \infty[$  (b)  $[-0.25, \infty[$   
(c)  $]0, \infty[$  (d)  $]-\infty, 0.25[$
- (4) The function  $f(X) = X(11 - 2X) + 6$  is not negative at  $X \in \dots\dots\dots$
- (a)  $[2, 3[$  (b)  $\mathbb{R} - [2, 3[$  (c)  $]2, 6[$  (d)  $[-0.5, 6]$
- (5) The solution set of the inequality :  $(X - 2)(X - 1) \leq 6$  in  $\mathbb{R}$  is  $\dots\dots\dots$
- (a)  $[-1, 4]$  (b)  $\mathbb{R} - [1, 2]$  (c)  $]2, 3[$  (d)  $[1, 6]$
- (6) If  $L, M$  are the two roots of the equation :  $(2 - k)X^2 + (2 - k)X + 4 = 0$  and  $LM = 2$ , then  $k = \dots\dots\dots$
- (a) 5 (b) 0 (c) 4 (d) -2
- (7) If the two roots of the equation :  $-X(X - 4) = k$  are real, then  $k \in \dots\dots\dots$
- (a)  $]-\infty, 4[$  (b)  $[-0.25, \infty[$  (c)  $]-\infty, 4]$  (d)  $]-\infty, -4[$
- (8) If  $L, M$  are the two roots of the equation :  $X^2 - 3X + 2 = 0$ , then the equation with two roots  $L + 1, M + 1$  is  $\dots\dots\dots$
- (a)  $X^2 - 5X + 6 = 0$  (b)  $X^2 - 6X + 5 = 0$   
(c)  $X^2 + 5X + 6 = 0$  (d)  $X^2 - 4X + 3 = 0$
- (9) ABCDEF is a regular hexagon of side length 6 cm. inscribed in a circle, then the length of arc BC =  $\dots\dots\dots$  cm.
- (a)  $3\pi$  (b)  $2\pi$  (c)  $\pi$  (d)  $6\pi$
- (10) If  $\theta$  is the measure of an angle in the standard position, its terminal side intersect the unit circle at the point  $(0.6, y)$ , then  $\csc \theta = \dots\dots\dots$ ,  $y > 0$
- (a) 0.6 (b) 0.8 (c) 1.25 (d) 1.4
- (11) If  $\cot(90^\circ - \theta) = \cot(2\theta)$ ,  $0 < \theta < 90^\circ$ , then  $\sin 3\theta = \dots\dots\dots$
- (a) 3 (b) 4 (c) 2 (d) 1

- (12) The angle of measure  $2.02^{\text{rad}}$  lies in the ..... quadrant.  
 (a) second (b) first (c) third (d) fourth
- (13) Number of times of intersections between the curve  $y = \sin 3x$  with the  $x$ -axis on the interval  $[0, 2\pi] =$  .....  
 (a) 2 (b) 7 (c) 6 (d) 3
- (14) If  $\tan \theta = 0.75$ ,  $0 < \theta < 90^\circ$ , then  $\sec (270^\circ - \theta) \approx$  .....  
 (a) 1.3 (b) -1.45 (c) -1.67 (d) 2.1
- (15) The ratio between two corresponding sides of two similar triangle is  $2 : 5$  if the area of the first one =  $16 \text{ cm}^2$ , then the area of the second one = .....  $\text{cm}^2$   
 (a) 100 (b) 80 (c) 40 (d) 120

(16) In the opposite figure :

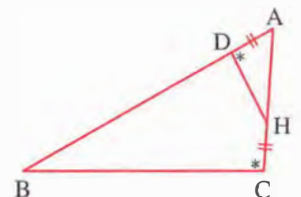
$AB = 10 \text{ cm.}$ ,  $CD = 15 \text{ cm.}$   
 , then  $AC =$  .....  $\text{cm.}$



- (a) 4 (b) 5  
 (c) 15 (d) 18
- (17)  $\overline{AB}$  is a chord of length =  $8 \text{ cm.}$  in a circle of center  $M$ ,  $\overline{MC} \perp \overline{AB}$  to intersect it at  $C$  and intersect the circle at  $D$  if  $CD = 2 \text{ cm.}$ , then the length of the radius of the circle = .....  $\text{cm.}$   
 (a) 8 (b) 4 (c) 5 (d) 7
- (18) Two concentric circles at  $M$ , the lengths of their radii are  $12 \text{ cm.}$ ,  $7 \text{ cm.}$ ,  $\overline{AD}$  is a chord in the larger circle to intersect the smaller circle at  $B$  and  $C$  respectively, then  $AB \times AC =$  .....  
 (a) 19 (b) 84 (c) 25 (d) 95

(19) In the opposite figure :

$AD = 3 \text{ cm.}$ ,  $AH = 6 \text{ cm.}$   
 ,  $AD = HC$ ,  $DH = x \text{ cm.}$   
 ,  $BC = (x + 10) \text{ cm.}$   
 , then  $x =$  .....



- (a) 5 (b) 3 (c) 8 (d) 4
- (20) If  $k$  is the scale factor of similarity of polygon  $M_1$  to polygon  $M_2$ ,  $k > 1$ , then the polygon  $M_1$  is ..... polygon  $M_2$   
 (a) congruent to (b) enlargement to  
 (c) minimization to (d) half the area of the

- (21) XYZ is a right-angled triangle at Y ,  $\overline{YL} \perp \overline{XZ}$  , XY = 6 cm. , YZ = 8 cm.  
 , then XL = .....

(a) 10 (b) 4.8 (c) 3.6 (d) 6.4

- (22) In the opposite figure :

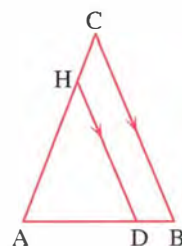
$\overline{DH} \parallel \overline{BC}$  , CH = X cm.

, AH = 12 cm. , BD = 3 cm.

, AD = (X + 5) cm.

, then X = .....

(a) 9 (b) 12 (c) 4 (d) 3



- (23) In the opposite figure :

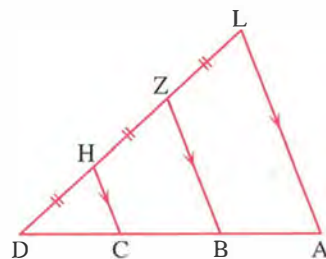
$\overline{CH} \parallel \overline{BZ} \parallel \overline{AL}$  , DH = HZ = ZL

, AB = X cm. , BC = 2 X - 7 cm.

, CD = X - y cm.

, then X + y = ..... cm.

(a) 9 (b) 7 (c) 5 (d) 3



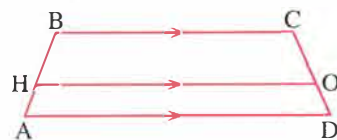
- (24) In the opposite figure :

$\overline{BC} \parallel \overline{HO} \parallel \overline{AD}$  , BC = 16 cm.

, AD = 24 cm. ,  $\frac{BH}{HA} = \frac{5}{3}$

, then HO = ..... cm.

(a) 12 (b) 17 (c) 21 (d) 25



- (25) ABC is a triangle in which AB = 8 cm. , AC = 6 cm. ,  $\overline{AD}$  bisect  $\angle CAB$  and intersect  $\overline{BC}$  at D , AD = 6 cm. , then BD = ..... cm.

(a) 4 (b) 8 (c) 3 (d) 6

- (26) ABC is a triangle in which  $\overline{BD}$  bisects the exterior angle B and intersects  $\overline{AC}$  at D , if AB = 8 cm. , BC = 6 cm. , DC = 15 cm. , then AC = ..... cm.

(a) 5 (b) 10 (c) 12 (d) 20

- (27) If a point C is outside the circle M ,  $\overline{CB}$  is tangent to the circle at B and CD intersecting circle at H , D and passes throw the center M , if  $m(\angle C) = 20^\circ$  , then the measure of the arc  $(\widehat{BD}) = \dots\dots\dots^\circ$

(a) 90 (b) 110 (c) 100 (d) 60

## Second Essay questions

Answer the following questions :

**1** Find the necessary condition to be one of two roots of the equation :

$$b x^2 - 4 b x + a = 0 \text{ three times of the other root.}$$

**2** ABC is triangle in which  $\overrightarrow{BM}$ ,  $\overrightarrow{CM}$  bisects exterior angles at B and C respectively,  $\overrightarrow{BM} \cap \overrightarrow{CM} = \{M\}$  Prove that :  $\overrightarrow{AM}$  bisects  $\angle BAC$

**8** El-Kalyoubia Governorate



Mathematics Supervision

## First Multiple choice questions



Interactive tests 8

Choose the correct answer from those given :

(1) If one of the two roots of the equation :  $x^2 - (k - 9)x - 17 = 0$  is the additive inverse of the other root , then  $k = \dots\dots\dots$

- (a) 17 (b) 9 (c) -9 (d) -17

(2) The conjugate of the number  $3 - 2i$  is  $\dots\dots\dots$

- (a)  $-3 + 2i$  (b)  $-3 - 2i$  (c)  $3 + 2i$  (d)  $2 + 3i$

(3) The equation where its two roots are  $3i$  and  $-3i$  is  $\dots\dots\dots$

- (a)  $x^2 = 9i$  (b)  $x^2 - 9 = 0$   
(c)  $x^2 + 9 = 0$  (d)  $x^2 - 6x + 9 = 0$

(4) The function  $f(x) = 6 - 2x$  is not negative at  $\dots\dots\dots$

- (a)  $x > 3$  (b)  $x < 3$  (c)  $x \geq 3$  (d)  $x \leq 3$

(5) The equation :  $2x^2 - 4x + k = 0$  has two different real roots if  $\dots\dots\dots$

- (a)  $k = 8$  (b)  $k > 2$  (c)  $k < 2$  (d)  $k = 2$

(6) The solution set of the inequality :  $x^2 - 5x \leq 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $[0, 5]$  (b)  $]5, \infty[$  (c)  $] - \infty, 5[$  (d)  $\emptyset$

(7) If the two roots of the equation :  $ax^2 + bx + c = 0$  are 4 and 5 , then  $\frac{b+c}{a} = \dots\dots\dots$

- (a) 20 (b) 11 (c) 9 (d) 5

(8) The measure of the central angle in a circle of radius length 15 cm. and opposite to an arc of length  $5\pi$  cm. =  $\dots\dots\dots^\circ$

- (a) 60 (b) 90 (c) 120 (d) 150

(9) The angle whose measure  $\frac{7\pi}{6}$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

(10) The maximum value of the function :  $f(x) = 2 \sin 5x$  is .....

- (a) 5 (b) 2 (c) -2 (d) -5

(11) The general solution of the equation :  $\tan 5\theta = \cot 4\theta$  is ..... where  $n \in \mathbb{Z}$

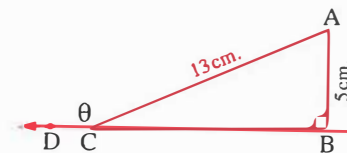
- (a)  $\frac{\pi}{2} + \frac{2\pi}{9}n$  (b)  $\frac{\pi}{18} + \frac{2\pi}{9}n$  (c)  $\frac{\pi}{18} + \frac{\pi}{9}n$  (d)  $\frac{\pi}{2} + \frac{\pi}{9}n$

(12) In the opposite figure :

If  $D \in \overrightarrow{BC}$

, then  $\cos \theta = \dots\dots\dots$

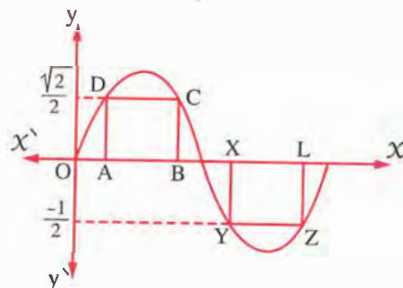
- (a)  $\frac{12}{13}$  (b)  $\frac{5}{13}$   
(c)  $\frac{-5}{13}$  (d)  $\frac{-12}{13}$



(13) The opposite figure represent the function  $f(x) = \sin x$

, then  $\frac{\text{the area of rectangle ABCD}}{\text{the area of rectangle XYZL}} = \dots\dots\dots$

- (a)  $\frac{3\sqrt{2}}{4}$  (b)  $\frac{3\sqrt{2}}{2}$   
(c)  $\frac{5\sqrt{2}}{2}$  (d)  $\frac{5\sqrt{2}}{4}$



(14) If L and M are the two roots of the equation :  $x^2 - 7x + 3 = 0$

, then the value of :  $L^2M + LM^2 = \dots\dots\dots$

- (a) 7 (b) 3 (c) 10 (d) 21

(15) If  $\triangle ABC \sim \triangle DEF$ ,  $AB = 2$  cm. ,  $DE = 4$  cm. ,  $EF = 8$  cm.

, then the length of  $\overline{BC} = \dots\dots\dots$  cm.

- (a) 1 (b) 2 (c) 3 (d) 4

(16) If the ratio between the perimeter of two similar polygons is 4 : 9 , then the ratio between their areas is .....

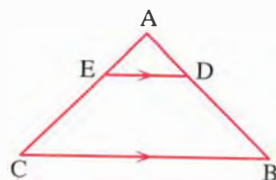
- (a) 2 : 3 (b) 4 : 9 (c) 16 : 81 (d) 81 : 16

(17) In the opposite figure :

$\overline{DE} \parallel \overline{BC}$  ,  $2AD = DB$  ,  $DE = 4$  cm.

, then  $BC = \dots\dots\dots$  cm.

- (a) 6 (b) 8  
(c) 12 (d) 16



**(18) In the opposite figure :**

$\overrightarrow{AD}$  bisects  $\angle BAC$ ,  $BD = 18$  cm.

,  $AB = 27$  cm. ,  $AC = 15$  cm.

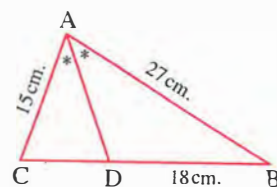
, then  $AD = \dots\dots\dots$  cm.

(a) 15

(b) 10

(c) 9

(d) 8



**(19) In the opposite figure :**

$\overrightarrow{CB} \cap \overrightarrow{ED} = \{A\}$ ,  $m(\widehat{CE}) = 130^\circ$

,  $m(\angle A) = 40^\circ$

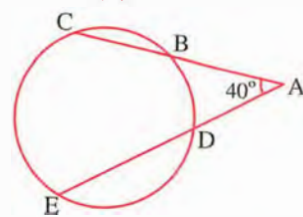
, then  $m(\widehat{BD}) = \dots\dots\dots^\circ$

(a) 40

(b) 50

(c) 65

(d) 85



**(20) In the opposite figure :**

$\overline{DE} \parallel \overline{BC}$ ,  $m(\angle A) = 90^\circ$

,  $BD = 3$  cm. ,  $AE = 8$  cm.

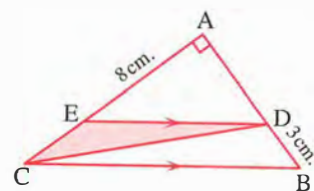
, then the area of  $\triangle DEC = \dots\dots\dots \text{cm}^2$

(a) 24

(b) 18

(c) 12

(d) 10



**(21) In the opposite figure :**

$\overrightarrow{AB}$  is tangent to the circle M

,  $AC = 9$  cm. ,  $CD = 7$  cm.

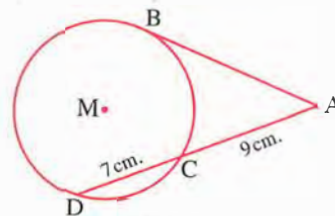
, then  $AB = \dots\dots\dots$  cm.

(a) 4

(b)  $3\sqrt{7}$

(c) 12

(d) 16



**(22)** If  $P_M(A) = 64$ ,  $MA = 10$  cm. , then the circumference of the circle M =  $\dots\dots\dots$

(a)  $6\pi$

(b)  $10\pi$

(c)  $12\pi$

(d)  $36\pi$

**(23) In the opposite figure :**

$\overline{AB} \cap \overline{CD} = \{E\}$ ,  $AE = x - 1$

,  $EB = x + 1$ ,  $CE = 3$  cm.

,  $ED = 8$  cm.

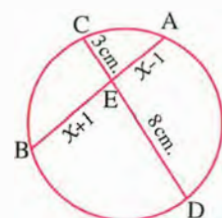
, then  $x = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 5

(d) 6



**(24) In the opposite figure :**

$\overrightarrow{AD}$  bisects  $(\angle EAC)$ ,  $AB = 8$  cm.

,  $BC = 6$  cm. ,  $AC = 4$  cm.

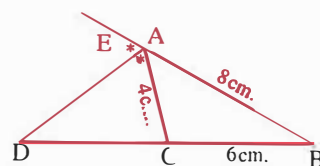
, then  $CD = \dots\dots\dots$  cm.

(a) 6

(b) 8

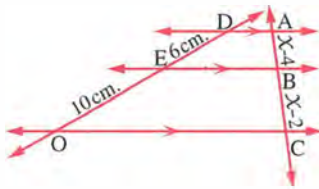
(c) 9

(d) 12



(25) In the opposite figure :

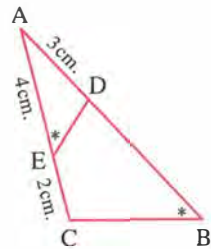
$\overleftrightarrow{AD} \parallel \overleftrightarrow{BE} \parallel \overleftrightarrow{OC}$  ,  $AB = x - 4$   
 ,  $BC = x - 2$  ,  $DE = 6 \text{ cm.}$  ,  $EO = 10 \text{ cm.}$   
 , then  $x = \dots\dots\dots$



- (a) 4
- (b) 5
- (c) 6
- (d) 7

(26) In the opposite figure :

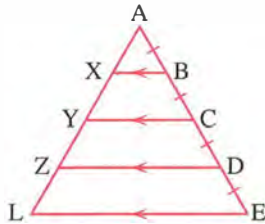
$m(\angle AED) = m(\angle B)$  ,  $AD = 3 \text{ cm.}$   
 ,  $AE = 4 \text{ cm.}$  ,  $CE = 2 \text{ cm.}$   
 , then  $BD = \dots\dots\dots \text{ cm.}$



- (a) 5
- (b) 6
- (c) 7
- (d) 8

(27) In the opposite figure :

$AB = BC = CD = DE$  ,  $\overleftrightarrow{XB} \parallel \overleftrightarrow{YC} \parallel \overleftrightarrow{ZD} \parallel \overleftrightarrow{LE}$   
 , the area of the figure  $CDZY = 20 \text{ cm}^2$   
 , then the area of the figure  $DELZ = \dots\dots\dots \text{ cm}^2$



- (a) 28
- (b) 35
- (c) 42
- (d) 49

Second

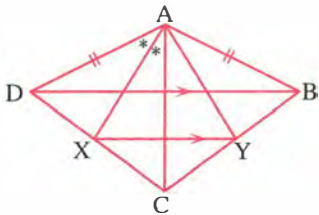
Essay questions

Answer the following questions :

1 If  $L$  ,  $M$  are the two roots of the equation :  $x^2 - 5x + 7 = 0$   
 , find the numerical value of :  $L^2 + 5M - 2LM$

2 In the opposite figure :

$ABCD$  is quadrilateral where  $AB = AD$   
 ,  $\overleftrightarrow{AX}$  bisects  $\angle CAD$  ,  $\overleftrightarrow{XY} \parallel \overleftrightarrow{BD}$   
 Prove that :  $\overleftrightarrow{AY}$  bisects  $\angle BAC$





**First Multiple choice questions**



Interactive tests (9)

**Choose the correct answer from those given :**

(1) The simplest form of  $i^{42}$  is .....

- (a) 1 (b) -1 (c) i (d) -i

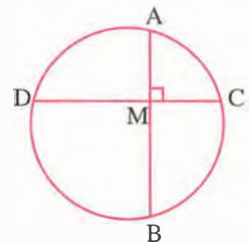
(2) The smallest positive measure of the angle whose measure  $-750^\circ$  is .....

- (a)  $\frac{6\pi}{11}$  (b)  $\frac{11\pi}{6}$  (c)  $\frac{6\pi}{5}$  (d)  $\frac{5\pi}{6}$

(3) In the opposite figure :

$m(\widehat{AC}) + m(\widehat{BD}) = \dots\dots\dots$

- (a)  $45^\circ$   
(b)  $90^\circ$   
(c)  $180^\circ$   
(d)  $270^\circ$



(4) In the opposite figure :

$\overline{BC} \parallel \overline{DH}$ ,  $BC = 5$  cm. ,  $DH = 3$  cm.  
 , then  $x = \dots\dots\dots$

- (a) 4 (b) 8 (c) 11 (d) 15



(5) The directed angle its terminal side cut the unit circle at  $(a, b)$  ,  $a > 0$  ,  $b < 0$  lies in ..... quadrant

- (a) fourth. (b) second. (c) first. (d) third.

(6) The conjugate of  $(3i - 4)$  is .....

- (a)  $-3i + 4$  (b)  $3i - 4$  (c)  $3i + 4$  (d)  $-3i - 4$

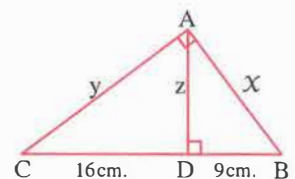
(7) A is point outside the circle M ,  $AM = 8$  cm. ,  $r = 5$  cm. , then  $P_M(A) = \dots\dots\dots$

- (a) 30 (b) 39 (c) -39 (d) -30

(8) In the opposite figure :

$AB = x$  cm. ,  $AD = z$  cm.  
 ,  $AC = y$  cm. ,  $BD = 9$  cm. ,  $CD = 16$  cm.  
 , then  $x + y + z = \dots\dots\dots$

- (a) 12 (b) 15 (c) 20 (d) 47



(9) If  $x = -1$  is one root of roots of :  $x^2 - kx - 6 = 0$  , then  $k = \dots\dots\dots$

- (a) 5 (b) -5 (c) 6 (d) -6

(10) Arc of circle its length is  $5\pi$  and the radius of circle 15 cm. opposite to central angle its measure .....

- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $180^\circ$

(11) If the ratio between the area of two similar triangles is 4 : 9 and the perimeter of smaller triangle 60 cm. , then the perimeter of greatest one = ..... cm.

- (a) 70 (b) 80 (c) 90 (d) 120

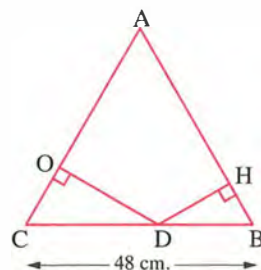
(12) In the opposite figure :

ABC is isosceles triangle

,  $AB = AC$  ,  $BC = 48$  cm.

,  $\frac{DH}{DO} = \frac{5}{7}$

, then  $DC = \dots\dots\dots$



- (a) 12 (b) 20

- (c) 24 (d) 28

(13) The range of function  $f(x) = 4 \sin x$  where  $x \in [0, \pi]$  = .....

- (a)  $[0, 4]$  (b)  $[0, 4[$  (c)  $[-4, 0]$  (d)  $[-4, 4]$

(14) If one root of two roots of equation :  $kx^2 - 7x + 2k - 3 = 0$  is multiplicative inverse of other , then  $k = \dots\dots\dots$

- (a) 3 (b) 1 (c) -3 (d) -1

(15) In the opposite figure :

Semicircle its center M

, then  $x = \dots\dots\dots$



- (a) 3 (b) 5 (c) 7 (d) 8

(16) If  $k$  is similarity coefficient between two polygons , then the two polygons are congruent if .....

- (a)  $k = 0$  (b)  $k > 0$  (c)  $0 < k < 1$  (d)  $k = 1$

(17) If  $L, M$  two roots of equation :  $x^2 - 8x + 15 = 0$  ,  $L > M$  , then  $L + 2M = \dots\dots\dots$

- (a) 11 (b) 8 (c) 15 (d) -8

(18) If  $\theta$  is acute angle , where  $\sin 2\theta = \cos \theta$  , then  $\tan(\theta + 15) = \dots\dots\dots$

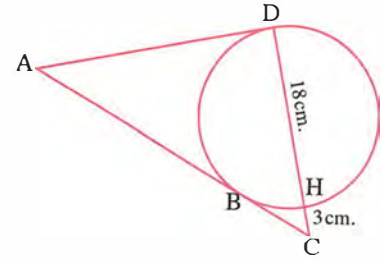
- (a)  $\frac{1}{2}$  (b) -1 (c) 1 (d)  $\frac{\sqrt{3}}{2}$

(19) The bisector of exterior angle of vertex of an isosceles triangle ..... its base.

- (a) bisect (b) perpendicular (c) parallel (d) congruent

**(20) In the opposite figure :**

$\overrightarrow{AD}$ ,  $\overrightarrow{AB}$  two tangents of the circle at D  
 , B respectively ,  $\overrightarrow{CH}$  cut the circle at H , D  
 and  $CH = 3$  cm. ,  $HD = 18$  cm.  
 , then  $(AC - AD) = \dots\dots\dots$  cm.



(a)  $7\sqrt{2}$

(b)  $7\sqrt{3}$

(c)  $2\sqrt{7}$

(d)  $3\sqrt{7}$

**(21)** If L , M are roots of equation :  $X^2 - 5X - 6 = 0$  , then  $L^2 - 5L + 3 = \dots\dots\dots$

(a) - 6

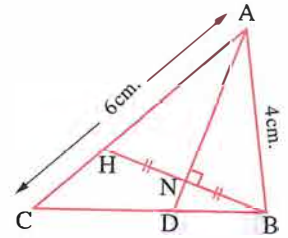
(b) 6

(c) 9

(d) - 3

**(22) In the opposite figure :**

If  $AC = 6$  cm. ,  $AB = 4$  cm.  
 , N midpoint of  $\overline{BH}$   
 ,  $\overline{AD} \perp \overline{BH}$   
 , then  $\frac{BD}{DC} = \dots\dots\dots$



(a)  $\frac{1}{2}$

(b)  $\frac{2}{3}$

(c)  $\frac{1}{3}$

(d)  $\frac{3}{2}$

**(23)** The sign of function  $f(X) = 7 - X$  is not negative in  $\dots\dots\dots$

(a)  $]-\infty, 7[$

(b)  $[0, 7[$

(c)  $]-\infty, 7]$

(d)  $\mathbb{R}$

**(24)** If  $\cot(180^\circ + \theta) = \frac{3}{4}$  , then  $9 \tan^2 \theta = \dots\dots\dots$

(a) 9

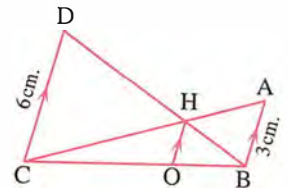
(b) 16

(c) 12

(d) 6

**(25) In the opposite figure :**

If  $\overline{AB} \parallel \overline{HO} \parallel \overline{CD}$   
 ,  $AB = 3$  cm. ,  $DC = 6$  cm.  
 , then  $HO = \dots\dots\dots$



(a) 2

(b) 2.5

(c) 1.5

(d) 1

**(26)** If  $X^2 - 2\sqrt{2}X + a = 0$  and its roots are complex and not real , then  $a \in \dots\dots\dots$

(a)  $]-\infty, 2]$

(b)  $[2, \infty[$

(c)  $]2, \infty[$

(d)  $[-2, 2]$

**(27)** ABC is right-angled triangle at B ,  $\overrightarrow{AD}$  bisect  $\angle A$  and cut  $\overline{BC}$  at D , then  $BD = 24$  cm. ,  
 $BA : AC = 3 : 5$  , then the perimeter of triangle ABC =  $\dots\dots\dots$

(a) 177

(b) 182

(c) 184

(d) 192

## Second Essay questions

Answer the following questions :

- 1 Determine the sign of function  $f(x) = x^2 - x - 6$ , then find the solution set of the inequality  $f(x) > \text{zero}$

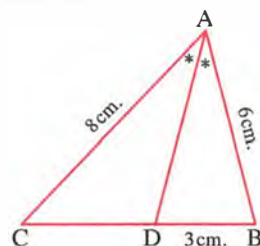
- 2 In the opposite figure :

$\overrightarrow{AD}$  bisect  $\angle A$  and cut  $\overline{BC}$  in D

,  $AB = 6 \text{ cm.}$  ,  $AC = 8 \text{ cm.}$

,  $BD = 3 \text{ cm.}$

Find the length of :  $\overline{AD}$



## 10 El-Monofia Governorate



Shebin El-Khoun Directorate  
Mathematics Supervision

## First Multiple choice questions



Interactive  
tests 10

Choose the correct answer from those given :

- (1) If the two roots of the equation :  $x^2 + 2x + k = 0$  are real , then  $k \in \dots\dots\dots$
- (a)  $[1, \infty[$  (b)  $]1, \infty[$  (c)  $]-\infty, 1]$  (d)  $]-\infty, 1[$
- (2) The quadratic function  $f : f(x) = x^2 - 7x + 10$  is negative in the interval  $\dots\dots\dots$
- (a)  $]2, 5[$  (b)  $\mathbb{R} - ]2, 5[$  (c)  $[2, 5]$  (d)  $\mathbb{R} - [2, 5]$
- (3) If  $8x + yi = i^{47} + 24$  , where  $i^2 = -1$  , then  $x - y = \dots\dots\dots$
- (a) 2 (b) 4 (c) -4 (d) 25
- (4) The equation which its two roots are  $3i$  and  $-3i$  is  $\dots\dots\dots$
- (a)  $x^2 = 3i$  (b)  $x^2 - 9 = 0$   
(c)  $x^2 - 6i + 9 = 0$  (d)  $x^2 + 9 = 0$
- (5) The solution set of the inequality  $x(x - 2) \leq 15$  in  $\mathbb{R}$  is  $\dots\dots\dots$
- (a)  $\mathbb{R} - \{-3, 5\}$  (b)  $\mathbb{R} - ]3, 5[$   
(c)  $[-3, 5]$  (d)  $\mathbb{R} - [-3, 5]$
- (6) The value of  $\sec(300^\circ) \sin(270^\circ - \theta) + \tan(-45^\circ) \cos(360^\circ - \theta)$  is  $\dots\dots\dots$
- (a)  $-3 \sin \theta$  (b)  $-3 \cos \theta$  (c)  $3 \cos \theta$  (d) 0
- (7) If the product of two roots of the equation :  $(k - 2)x^2 - 6x + 12 = 0$  equals 3 , then  $k = \dots\dots\dots$
- (a) 6 (b) 4 (c) 14 (d) 2

(8) If  $L^2$  and  $L$  are the two roots of the equation :  $X^2 + aX + 8 = 0$  , then  $a = \dots\dots\dots$

- (a)  $-6$  (b)  $6$  (c)  $4$  (d)  $8$

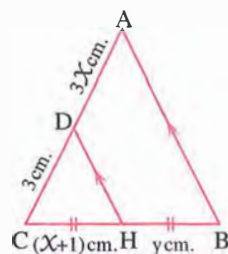
(9) The conjugate of the number  $(5i - 2)$  is  $\dots\dots\dots$

- (a)  $5i + 2$  (b)  $-5i + 2$  (c)  $-2 - 5i$  (d)  $7 - 7i$

(10) In the opposite figure :

$X + y = \dots\dots\dots$

- (a)  $1$  (b)  $8$   
(c)  $2$  (d)  $3$



(11) The measure of the smallest positive angle satisfy the relation :

$2 \sin \theta = -1$  is  $\dots\dots\dots$

- (a)  $30^\circ$  (b)  $120^\circ$  (c)  $210^\circ$  (d)  $300^\circ$

(12) The maximum value of the function  $f : f(\theta) = 3 \sin 2\theta$  is  $\dots\dots\dots$

- (a)  $3$  (b)  $-3$  (c)  $2$  (d)  $-2$

(13) If  $\sec(3\theta + 15) = \csc(35 - \theta)$  where  $\theta$  is an acute angle , then  $\csc \frac{3}{2}\theta = \dots\dots\dots$

- (a)  $2$  (b)  $\sqrt{3}$  (c)  $\sqrt{2}$  (d)  $\frac{1}{2}$

(14) If the terminal side of the angle  $\theta$  in standard position intersects the unit circle at the point  $B\left(x, \frac{4}{5}\right)$  , where  $x < 0$  , then  $\sin(270^\circ - \theta) = \dots\dots\dots$

- (a)  $-\frac{3}{5}$  (b)  $\frac{4}{5}$  (c)  $\frac{3}{5}$  (d)  $-\frac{4}{5}$

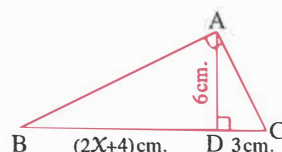
(15) The length of the arc of circle whose diameter length is  $12$  cm. and opposite to a central angle of measure  $90^\circ = \dots\dots\dots$  cm.

- (a)  $\frac{3}{2}\pi$  (b)  $3\pi$  (c)  $6\pi$  (d)  $\frac{5}{2}\pi$

(16) In the opposite figure :

$X = \dots\dots\dots$

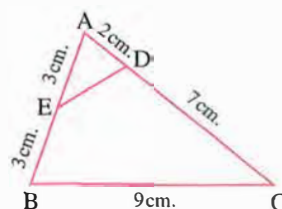
- (a)  $5.3$  (b)  $4$   
(c)  $-1$  (d)  $0$



(17) In the opposite figure :

$DE = \dots\dots\dots$  cm.

- (a)  $2$  (b)  $4.5$   
(c)  $3$  (d)  $5$



**(18) In the opposite figure :**

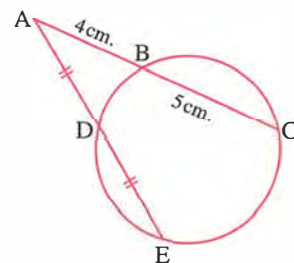
AD = ..... cm.

(a)  $2\sqrt{3}$

(c) 10

(b)  $3\sqrt{2}$

(d) 4



**(19) In the opposite figure :**

If  $\overline{DE} \parallel \overline{BC}$

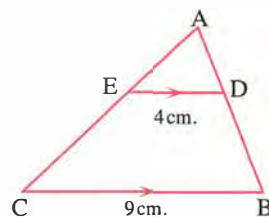
, then  $\frac{\text{area of } \triangle ADE}{\text{area of figure DBCE}} = \dots\dots\dots$

(a)  $\frac{4}{9}$

(c)  $\frac{16}{65}$

(b)  $\frac{16}{81}$

(d)  $\frac{2}{3}$



**(20) In the opposite figure :**

$\triangle ABC \sim \triangle EDC$

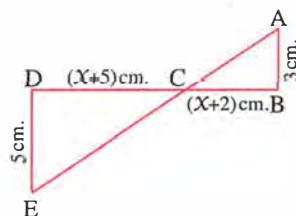
, then  $X = \dots\dots\dots$

(a)  $\frac{2}{5}$

(c) 9.5

(b) 2.5

(d) 3



**(21)** If the ratio between the areas of two similar triangles 4 : 9 , and the perimeter of the greater triangle = 90 cm. , then the perimeter of the smaller triangle = ..... cm.

(a) 30

(b) 135

(c) 180

(d) 60

**(22)** The exterior bisector of the vertex of the isosceles triangle ..... its base.

(a) bisects

(c) parallel to

(b) congruent to

(d) perpendicular to

**(23) In the opposite figure :**

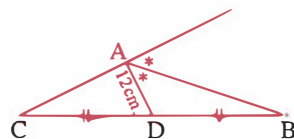
AC = ..... cm.

(a) 12

(c) 24

(b) 6

(d) 8



**(24) In the opposite figure :**

$\overline{AD} \parallel \overline{HE} \parallel \overline{BC}$  , AH = EC

, DE = 4 cm. and HB = 9 cm.

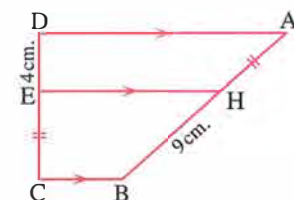
, then EC = ..... cm.

(a) 36

(c) 6

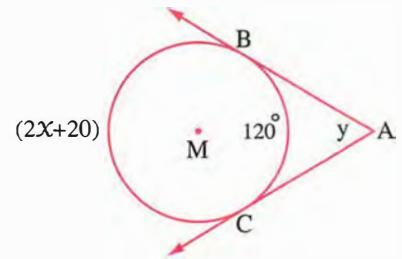
(b) 12

(d) 5



**(25) In the opposite figure :**

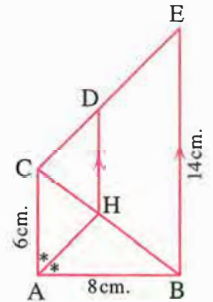
$\overrightarrow{AB}$  ,  $\overrightarrow{AC}$  are two tangents to the circle M  
 $m(\widehat{BC}) = 120^\circ$  , the measure of the major  
 arc  $\widehat{BC} = (2X + 20)^\circ$  and  $m(\angle A) = y^\circ$   
 , then  $X + y = \dots\dots\dots^\circ$



- (a) 170                      (b) 50                      (c) 120                      (d) 60

**(26) In the opposite figure :**

$\overrightarrow{AH}$  bisects  $\angle BAC$  ,  $\overrightarrow{DH} \parallel \overrightarrow{EB}$   
 $AC = 6$  cm. ,  $AB = 8$  cm. and  $EB = 14$  cm.  
 , then  $DH = \dots\dots\dots$  cm.



- (a) 3                                      (b) 4  
 (c) 7                                      (d) 6

**(27)** If the distance between the point and the center of a circle = 15 cm. and the power of this point with respect to the circle =  $144 \text{ cm}^2$  , then the radius length of the circle =  $\dots\dots\dots$  cm.

- (a) 81                      (b) 9                      (c)  $\sqrt{963}$                       (d) 18

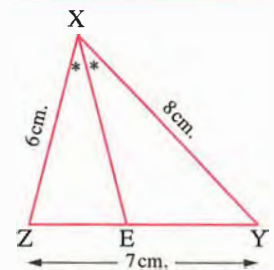
**Second Essay questions**

**Answer the following questions :**

**1** If L and M are the two roots of the equation :  $X^2 - 5X + 7 = 0$  , then find the equation whose roots are :  $(L + 2)$  ,  $(M + 2)$  ?

**2 In the opposite figure :**

$\overrightarrow{XE}$  bisects  $\angle YXZ$  and intersects  $\overrightarrow{YZ}$  at E  
 , if  $XZ = 6$  cm. ,  $XY = 8$  cm. and  $YZ = 7$  cm.  
 , then find the length of each of  $\overrightarrow{YE}$  and  $\overrightarrow{XE}$





**First Multiple choice questions**

**Choose the correct answer from those given :**

(1) If L and M are the two roots of the equation :  $X^2 + 1 = 0$  , then  $L^{2022} + M^{2022} = \dots\dots\dots$

- (a)  $-2i$  (b)  $2i$  (c)  $-2$  (d)  $2022$

(2) If the terminal side of the angle whose measure  $\theta$  drawn in the standard position intersects the unit circle at (a , b) , then  $\sin \theta + \tan \theta = \dots\dots\dots$

- (a)  $\frac{a-a}{a}$  (b)  $\frac{a+b}{a}$  (c)  $a - \frac{b}{a}$  (d)  $a - b$

(3) In the opposite figure :

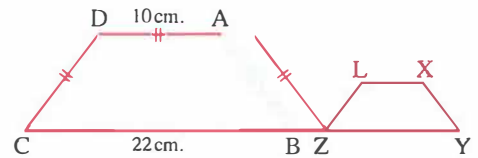
The polygon ABCD ~ The polygon XYZL

, the perimeter of XYZL = 26 cm.

, AD = 10 cm. , BC = 22 cm. , AB = AD = DC

, then  $\frac{AD}{XL} = \dots\dots\dots$

- (a) 1 : 2 (b) 2 : 3 (c) 3 : 4 (d) 2 : 1



(4) In the opposite figure :

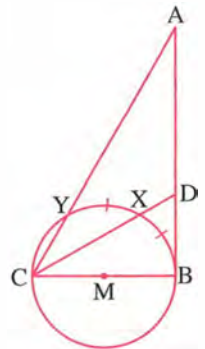
$\overline{AB}$  is a tangent to circle M at B

,  $m(\widehat{BX}) = m(\widehat{YX})$  ,  $BD = 2\sqrt{3}$  cm.

,  $AD = 4\sqrt{3}$  cm.

, then  $AY = \dots\dots\dots$  cm.

- (a) 3 (b) 6  
(c) 9 (d) 12



(5) If  $a + bi = \frac{2+i}{2-i}$  , then  $a^2 + b^2 = \dots\dots\dots$

- (a) 1 (b)  $-1$  (c) 2 (d)  $-i$

(6) The angle with measure  $\frac{3\pi}{2}$  in standard position  $\dots\dots\dots$

- (a) lies in the first quadrant. (b) lies in the second quadrant.  
(c) lies in the third quadrant. (d) is a quadrantal angle.

**( 7 ) In the opposite figure :**

If  $\frac{x-y}{x+y} = \frac{2}{7}$

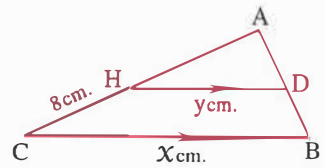
, then AH = ..... cm.

(a) 16

(b) 15

(c) 12

(d) 10



**( 8 ) In the opposite figure :**

A unit circle M and  $\overline{AB}$  is a tangent to the circle at B

,  $\overline{CD} \perp \overline{MB}$

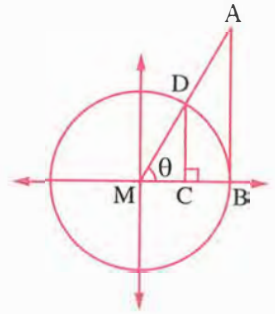
, then  $\frac{AB}{CD} = \dots\dots\dots$

(a)  $\sec \theta$

(b)  $\cos \theta$

(c)  $\tan \theta$

(d)  $\csc \theta$



**( 9 )** If one of the two roots of the equation :  $m x^2 + 2 x + 5 = 0$  is the multiplicative inverse of the other root , then m = .....

(a) - 5

(b) - 2

(c) 2

(d) 5

**(10)** If  $7 \csc \theta = 25$  , where  $\theta \in \left] \frac{\pi}{2}, \pi \right[$  , then  $\tan (\pi + \theta) - \cot \left( \theta - \frac{\pi}{2} \right) = \dots\dots\dots$

(a)  $-\frac{7}{24}$

(b) zero

(c)  $-\frac{7}{12}$

(d)  $\frac{7}{12}$

**(11)** If the ratio between the lengths of the diagonals of two squares is 2 : 5 and the area of the smaller square is  $4 \text{ cm}^2$  , then the area of the greater square = .....  $\text{cm}^2$

(a) 25

(b) 16

(c) 10

(d) 20

**(12)** The arc of length  $5 \pi \text{ cm}$ . in a circle of radius length 15 cm. is opposite to central angle of measure ..... $^\circ$

(a) 30

(b) 60

(c) 90

(d) 180

**(13) In the opposite figure :**

The figure EDBC is cyclic quadrilateral

, AE = 2.5 cm. , AD = 3 cm.

, DB = 2 cm.

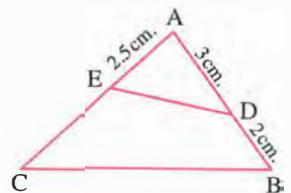
, then EC = ..... cm.

(a) 3.5

(b) 6

(c) 7.5

(d) 15



**(14)** If the two roots of the equation :  $x^2 - 4 x + k = 0$  are two equal real numbers , then k = .....

(a) 1

(b) 4

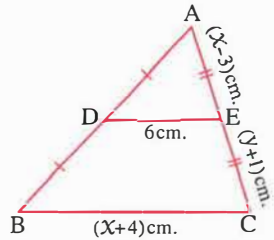
(c) 8

(d) 16

(15) In the opposite figure :

D is midpoint of  $\overline{AB}$  , E is midpoint of  $\overline{AC}$  ,  $DE = 6$  cm.  
 ,  $BC = x + 4$  cm. ,  $AE = x - 3$  cm. ,  $EC = 1 + y$  cm.  
 , then  $\frac{y}{x} = \dots\dots\dots$

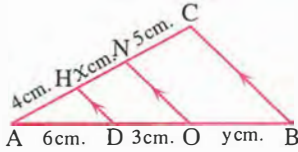
- (a) 3 : 4
- (b) 3 : 5
- (c) 2 : 1
- (d) 1 : 2



(16) In the opposite figure :

$\overline{HD} \parallel \overline{NO} \parallel \overline{CB}$  ,  $AD = 6$  cm. ,  $AH = 4$  cm.  
 ,  $OD = 3$  cm. ,  $CN = 5$  cm. ,  $BO = y$  cm. and  $HN = x$  cm.  
 , then  $x + y = \dots\dots\dots$  cm.

- (a) 9.5
- (b) 7.5
- (c) 8.5
- (d) 10



(17) The solution set of the inequality :  $-x(x+2) \geq 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{0, -2\}$
- (b)  $[-2, 0]$
- (c)  $]-2, 0[$
- (d)  $[-2, 2]$

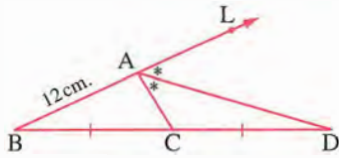
(18) The function  $f(x) = x^2 - 9$  is negative at  $x \in \dots\dots\dots$

- (a)  $\mathbb{R} - [-3, 4]$
- (b)  $]-3, 3[$
- (c)  $]-\infty, 9[$
- (d)  $]-\infty, 3[$

(19) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle LAC$  , C is midpoint of  $\overline{BD}$   
 ,  $AB = 12$  cm.  
 , then  $AC = \dots\dots\dots$  cm.

- (a) 3
- (b) 4
- (c) 6
- (d) 8



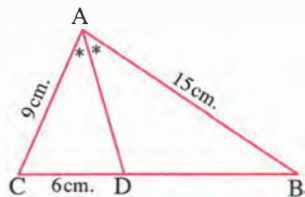
(20) The function  $f : [-3, 8] \longrightarrow \mathbb{R}$  where  $f(x) = 8 - 2x$  has a positive sign in the interval  $\dots\dots\dots$

- (a)  $]-3, 4]$
- (b)  $]4, 8[$
- (c)  $[-3, 4[$
- (d)  $[4, 8[$

(21) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle A$  ,  $AC = 9$  cm.  
  $AB = 15$  cm. ,  $CD = 6$  cm.  
 , then  $AD = \dots\dots\dots$  cm.

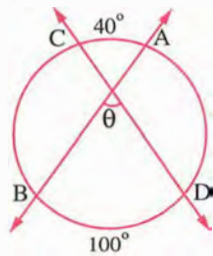
- (a)  $5\sqrt{3}$
- (b) 5
- (c) 3
- (d) 4



(22) In the opposite figure :

$\theta = \dots\dots\dots^\circ$

- (a) 50
- (b) 60
- (c) 70
- (d) 140



(23) If  $L, M$  are the two roots of the equation :  $x^2 - 2x + 3 = 0$  , then the quadratic equation whose roots are  $L + 2, M + 2$  is .....

(a)  $x^2 - 2x + 4 = 0$

(b)  $x^2 - 6x = -11$

(c)  $x^2 - 2x - 4 = 0$

(d)  $x^2 - 6x - 11 = 0$

(24) If  $P_M(A) = 81$  and  $\overline{AB}$  is a tangent to the circle  $M$  , then  $AB = \dots\dots\dots$  cm.

(a) 18

(b) 9

(c) 6

(d) 36

(25) If  $2 \cos (90^\circ + \theta) = 1$  , where  $\theta$  is the smallest positive angle , then  $\theta = \dots\dots\dots^\circ$

(a) 150

(b) 210

(c) 240

(d) 330

(26) In the opposite figure :

$m(\angle A) = 90^\circ$  ,  $\overline{AD} \perp \overline{CD}$  ,  $AC = x$  cm.

,  $AB = y$  cm. ,  $BD = 9$  cm. ,  $CD = 16$  cm.

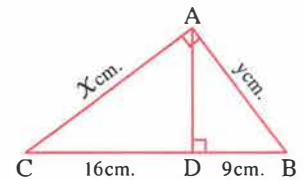
, then  $x - y = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 5

(d) 6



(27) The range of the function  $f$  , where :  $f(x) = a \sin(x)$  , and  $x \in [0, 2\pi]$  is  $[-5, 5]$  , then  $a \in \dots\dots\dots$

(a)  $\{5\}$

(b)  $\{-5\}$

(c)  $]-5, 5[$

(d)  $\{-5, 5\}$

## Second Essay questions

Answer the following questions :

1 Determine the sign of the function :  $f(x) = (2x - 3)^2$  , then represent your answer on the number line.

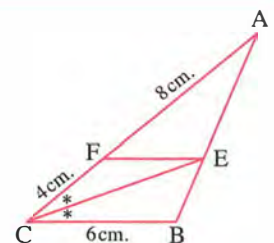
2 In the opposite figure :

$AF = 8$  cm. ,  $FC = 4$  cm.

,  $CB = 6$  cm.

,  $\overrightarrow{CE}$  bisects  $\angle C$

Prove that :  $\overline{FE} \parallel \overline{CB}$





**First Multiple choice questions**

**Choose the correct answer from those given :**

- (1)  $(-4i)(-6i) = \dots\dots\dots$   
 (a)  $-24$  (b)  $-10i$  (c)  $-24i$  (d)  $24i$
- (2) If the two roots of the equation :  $kx^2 - 8x + 16 = 0$  are complex and non-real , then .....  
 (a)  $k > 2$  (b)  $k < 2$  (c)  $k \in ]1, 10[$  (d)  $k > 1$
- (3) If one of the two roots of the equation :  $x^2 - (b-3)x + 5 = 0$  is the additive inverse of the other root , then  $b = \dots\dots\dots$   
 (a)  $-5$  (b)  $5$  (c)  $-3$  (d)  $3$
- (4) The quadratic equation whose roots are  $2i, -2i$  is .....  
 (a)  $x^2 + 4 = 0$  (b)  $x^2 - 4 = 0$   
 (c)  $x^2 = 4i$  (d)  $x^2 + 4i = 0$
- (5) The sign of the function  $f : f(x) = x^2 - 5x + 6$  is positive at .....  
 (a)  $\mathbb{R} - ]2, 3[$  (b)  $[2, 3]$  (c)  $]2, 3[$  (d)  $\mathbb{R} - [2, 3]$
- (6) The solution set of the inequality :  $x^2 - 7x + 10 < 0$  in  $\mathbb{R}$  is .....  
 (a)  $]2, 5[$  (b)  $\mathbb{R} - [2, 5]$  (c)  $[-2, 5]$  (d)  $\mathbb{R} - ]2, 5[$
- (7) The sign of the function  $f : f(x) = 5x$  is negative at .....  
 (a)  $]5, \infty[$  (b)  $]-\infty, 0[$  (c)  $]-5, \infty[$  (d)  $]-\infty, 0]$
- (8)  $L, M$  are two roots of the equation :  $x^2 - 3x - 5 = 0$  , then  $L^2 M^2 = \dots\dots\dots$   
 (a)  $25$  (b)  $-25$  (c)  $9$  (d)  $-9$
- (9) The measure of the central angle in a circle of radius length  $15$  cm. and opposite to an arc of length  $5\pi$  cm. equal .....  
 (a)  $30^\circ$  (b)  $90^\circ$  (c)  $60^\circ$  (d)  $180^\circ$
- (10) The angle of measure  $(-850^\circ)$  lies in the ..... quadrant.  
 (a) first (b) second (c) third (d) fourth

**(11) In the opposite figure :**

If  $AD = 5$  cm. ,  $AH = 4$  cm.

,  $HC = 6$  cm.

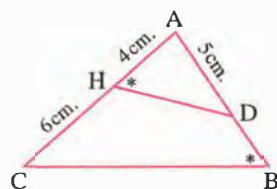
, then  $BD = \dots\dots\dots$  cm.

(a)  $8$

(b)  $12.5$

(c)  $3$

(d)  $7.5$



(12) If  $\cos \theta = \frac{1}{2}$ ,  $\sin \theta = -\frac{\sqrt{3}}{2}$ , then  $\tan \theta = \dots\dots\dots$

- (a)  $-\frac{1}{2}$  (b)  $\frac{\sqrt{3}}{2}$  (c)  $-\frac{1}{\sqrt{3}}$  (d)  $-\sqrt{3}$

(13) If  $\tan (4 \theta) = \cot (2 \theta)$ , where  $\theta \in \left[0, \frac{\pi}{6}\right]$ , then  $\cos (-3 \theta) = \dots\dots\dots$

- (a)  $-1$  (b)  $\frac{1}{\sqrt{2}}$  (c)  $1$  (d)  $\sqrt{2}$

(14) The range of the function  $f : f(x) = 4 \sin 5 \theta$  where  $\theta \in \mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\left[-\frac{1}{5}, \frac{1}{5}\right]$  (b)  $[-1, 1]$  (c)  $[-4, 4]$  (d)  $[-5, 5]$

(15) If the terminal side of the angle  $\theta$  in its standard position, cuts the unit circle at point  $\left(\frac{3}{5}, y\right)$  where  $y > 0$ , then  $\tan (\theta) = \dots\dots\dots$

- (a)  $\frac{3}{4}$  (b)  $\frac{4}{3}$  (c)  $1$  (d)  $-\frac{4}{5}$

(16) Two similar polygons, the ratio between their corresponding sides equal  $2 : 3$ , then the ratio between the lengths of their perimeters is  $\dots\dots\dots$  cm.

- (a)  $2 : 3$  (b)  $1 : 3$  (c)  $3 : 2$  (d)  $4 : 9$

(17) In the opposite figure :

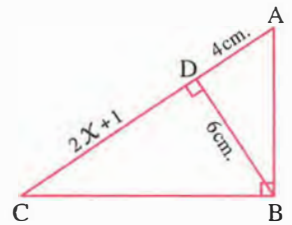
$\Delta ABC$  is right at  $B$ ,  $\overline{BD} \perp \overline{AC}$

,  $AD = 4$  cm. ,  $BD = 6$  cm.

,  $DC = (2x + 1)$  cm.

, then the value of  $x = \dots\dots\dots$  cm.

- (a) 9 (b) 4 (c) 2.5 (d) 1



(18) In the opposite figure :

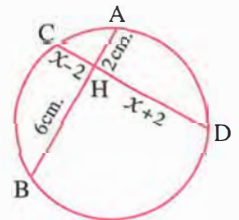
If  $AH = 2$  cm. ,  $BH = 6$  cm.

,  $HC = (x - 2)$  cm.

,  $HD = (x + 2)$  cm.

, then  $x = \dots\dots\dots$  cm.

- (a) 2 (b) 3 (c) 4 (d) 5



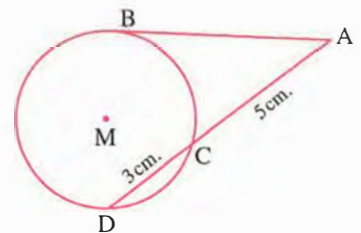
(19) In the opposite figure :

If  $\overrightarrow{AB}$  is a tangent to the circle  $M$  at  $B$

,  $AC = 5$  cm.  $DC = 3$  cm.

, then  $AB = \dots\dots\dots$  cm.

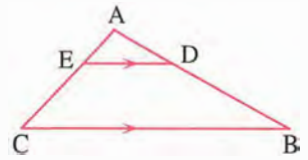
- (a) 15 (b) 40  
(c)  $10\sqrt{2}$  (d)  $2\sqrt{10}$



(20) In the opposite figure :

$\overline{DE} \parallel \overline{BC}$  ,  $\frac{DE}{BC} = \frac{3}{8}$   
 ,  $AD : DB = \dots\dots\dots$  :

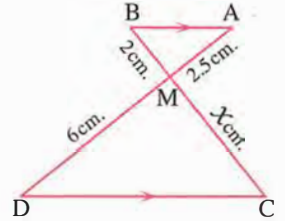
- (a) 8 : 3
- (b) 5 : 3
- (c) 3 : 5
- (d) 11 : 8



(21) In the opposite figure :

$\overline{AB} \parallel \overline{CD}$  ,  $AM = 2.5$  cm.  
 ,  $BM = 2$  cm. ,  $MD = 6$  cm.  
 , then  $x = \dots\dots\dots$

- (a) 4.8
- (b) 4
- (c) 4.2
- (d) 3.6



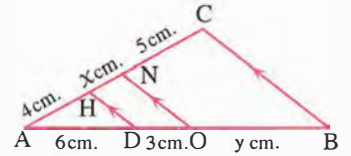
(22) If  $P_M(A) = r$  , then the point A lies .....

- (a) outside the circle.
- (b) inside the circle.
- (c) on the circle.
- (d) on the center of the circle.

(23) In the opposite figure :

$\overline{BC} \parallel \overline{ON} \parallel \overline{DH}$  ,  $AD = 6$  cm.  
 ,  $DO = 3$  cm. ,  $OB = y$  cm.  
 ,  $AH = 4$  cm. ,  $HN = x$  cm. ,  $NC = 5$  cm.  
 , then  $x + y = \dots\dots\dots$  cm.

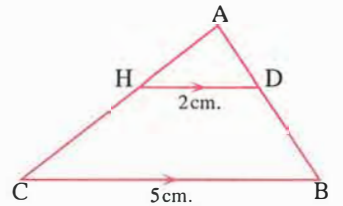
- (a) 7.5
- (b) 9.5
- (c) 8.5
- (d) 10



(24) In the opposite figure :

If the area of  $\triangle ADH = 24$  cm<sup>2</sup>  
 ,  $\overline{DH} \parallel \overline{BC}$  ,  $DH = 2$  cm. ,  $BC = 5$  cm.  
 , then the area of  $\triangle ABC = \dots\dots\dots$  cm<sup>2</sup>.

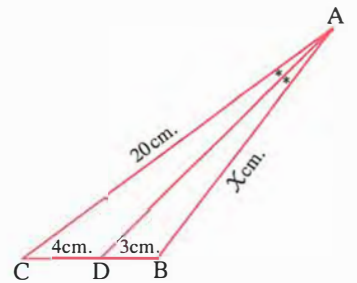
- (a) 36
- (b) 100
- (c) 126
- (d) 150



(25) In the opposite figure :

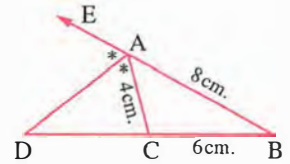
If  $\overrightarrow{AD}$  bisects  $\angle BAC$  ,  $AC = 20$  cm.  
 ,  $BD = 3$  cm. ,  $DC = 4$  cm.  
 , then  $x = \dots\dots\dots$  cm.

- (a) 3
- (b) 7
- (c) 15
- (d) 24



**(26) In the opposite figure :**

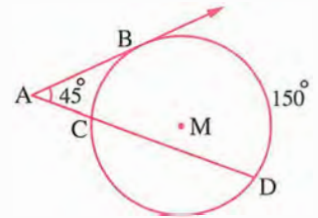
If  $\overrightarrow{AD}$  exterior bisector ,  $AC = 4$  cm.  
 ,  $BC = 6$  cm. ,  $AB = 8$  cm.  
 , then  $DC = \dots\dots\dots$  cm.



- (a) 2 (b) 4  
 (c) 6 (d) 8

**(27) In the opposite figure :**

If  $\overrightarrow{AB}$  is a tangent to the circle M at B  
 ,  $m(\angle A) = 45^\circ$  ,  $m(\widehat{BD}) = 150^\circ$   
 , then  $m(\widehat{BC}) = \dots\dots\dots^\circ$



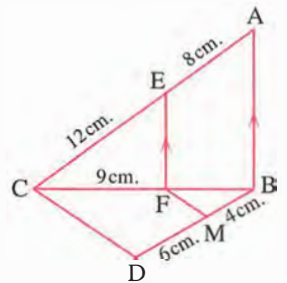
- (a) 60 (b) 90  
 (c) 120 (d) 180

**Second Essay questions**

Answer the following questions :

**1 In the opposite figure :**

$\overline{AB} \parallel \overline{EF}$  ,  $AE = 8$  cm.  
 ,  $CE = 12$  cm. ,  $CF = 9$  cm.  
 ,  $BM = 4$  cm. and  $DM = 6$  cm.



- (1) Find length of :  $\overline{BF}$   
 (2) Prove that :  $\overline{FM} \parallel \overline{CD}$

**2 Find in  $\mathbb{R}$  the solution set of the inequality :  $x^2 + 2x - 8 > 0$**

**13 El-Beheira Governorate**



Koum Hamada Directorate  
 Maths Supervision

**First Multiple choice questions**

Choose the correct answer from those given :

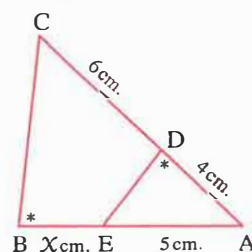
- (1)  $i^{41} = \dots\dots\dots$   
 (a) i (b) 1 (c) -i (d) -1  
 (2) If one of the two roots of the equation :  $x^2 - (5m - 15)x + L = 0$  is the additive inverse of the other , then  $m = \dots\dots\dots$   
 (a) 3 (b) 5 (c) -3 (d) -5

- (3) The angle of measure  $(-100^\circ)$  lies in the ..... quadrant.  
 (a) first (b) second (c) third (d) fourth
- (4) If  $\sin X = 0.6$ , then  $\sin (180^\circ + X) =$  .....  
 (a) 0.6 (b)  $-0.6$  (c) 0.8 (d)  $-0.8$
- (5) If L and M are the roots of the equation :  $X^2 + 7X + 6 = 0$ , then  $L^2 + M^2 =$  .....  
 (a) 13 (b) 14 (c) 37 (d) 49
- (6)  $f(X) = 2 - X$ , then  $f(X)$  is negative when .....  
 (a)  $X < 2$  (b)  $X > 2$  (c)  $X \geq -2$  (d)  $X \leq -2$
- (7) An inscribed angle of measure  $45^\circ$  subtend an arc, its length  $3\pi$  unit length, then radius length  $r =$  ..... unit.  
 (a) 3 (b) 6 (c) 9 (d) 12
- (8) The maximum value of  $f(X) = 3 \sin 5X + 4$  is .....  
 (a) 3 (b) 4 (c) 7 (d) 9
- (9) The quadratic equation of roots 3 and 5 is .....  
 (a)  $X^2 + 8X + 15 = 0$  (b)  $X^2 - 8X - 15 = 0$   
 (c)  $2X^2 - 16X + 30 = 0$  (d)  $X^2 = 15$
- (10) If the roots of the equation :  $X^2 + 6X + c = 0$  are equal, then  $c =$  .....  
 (a)  $-9$  (b)  $-6$  (c) 6 (d) 9
- (11) The solution set of the equation :  $(X - 2)^2 + (X - 2)^4 = 0$  in  $\mathbb{R}$  is .....  
 (a)  $\{2\}$  (b)  $\{4\}$  (c)  $\{2, 4\}$  (d)  $\emptyset$
- (12)  $(1 + i)(1 + i^2)(1 + i^3)(1 + i^4) =$  .....  
 (a) 0 (b) 1 (c) i (d)  $8i$
- (13) If  $\sin X = \cos 2X$ ,  $X \in$  first quadrant, then  $\tan(3X) =$  .....  
 (a) 1 (b) zero (c) 2 (d) undefined.
- (14) If  $X$  is a quadrantal angle, its terminal side pass through the point  $(\ell, m)$ , then  $\ell m =$  .....  
 (a) 0 (b) 1 (c) 2 (d) 3
- (15) Two similar triangles, the ratio between their two corresponding sides is  $3 : 5$ , the perimeter of the greater is 15 cm., then the perimeter of the smaller = ..... cm.  
 (a) 6 (b) 9 (c) 25 (d) 35

(16) In the opposite figure :

$m(\angle ADE) = m(\angle B)$   
 , then  $X =$  ..... cm.

- (a) 2 (b) 3  
 (c) 4 (d) 5



(17) In the opposite figure :

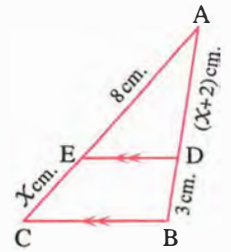
$x = \dots\dots\dots$

(a) 6

(b) 5

(c) 4

(d) 2



(18) In the opposite figure :

$AD = 3$  cm. ,  $AE = 4$  cm. ,  $DB = 5$  cm.

,  $EC = 2$  cm. ,  $CB = 12$  cm.

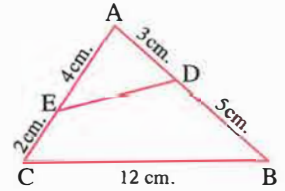
, then  $ED = \dots\dots\dots$  cm.

(a) 4

(b) 5

(c) 6

(d) 8



(19) In the opposite figure :

$\overrightarrow{MC}$  is a tangent ,  $MC = 10$  cm. ,  $AB = 15$  cm.

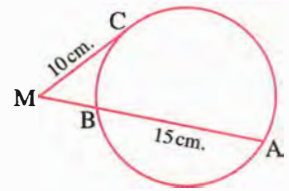
, then  $MB = \dots\dots\dots$  cm.

(a) 5

(b) 8

(c) 15

(d) 20



(20) In the opposite figure :

$\overline{AB}$  is a diameter in the circle ,  $AE = EM$

,  $ED = 3$  cm. ,  $EC = 4$  cm.

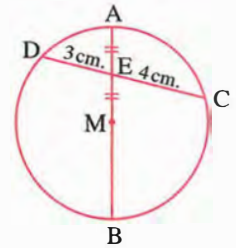
, then the circumference =  $\dots\dots\dots$  cm.

(a)  $4\pi$

(b)  $8\pi$

(c)  $16\pi$

(d)  $20\pi$



(21) In the opposite figure :

$\overline{AD} \perp \overline{BC}$  ,  $BD = 16$  cm.

,  $CD = 9$  cm.

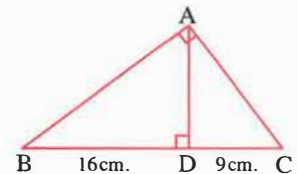
, then  $\frac{AB}{AC} = \dots\dots\dots$

(a)  $\frac{4}{3}$

(b)  $\frac{3}{4}$

(c)  $\frac{16}{9}$

(d) 2



(22) In the opposite figure :

$\overline{AD} \parallel \overline{BE} \parallel \overline{CO}$  ,  $AB = 6$  cm. ,  $BC = 10$  cm.

,  $OE = 2x$  cm. ,  $ED = x + 1$  cm.

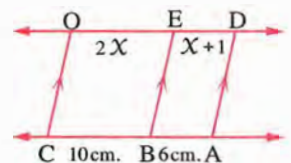
, then  $x = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 5

(d) 8



**(23) In the opposite figure :**

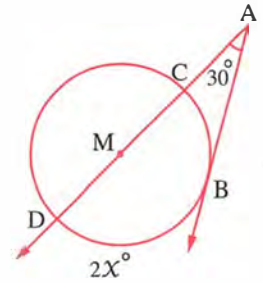
$m(\angle A) = 30^\circ$  ,  $m(\widehat{BD}) = 2x^\circ$   
 , then  $x = \dots\dots\dots^\circ$

(a) 30

(b) 40

(c) 60

(d) 75



**(24) In the opposite figure :**

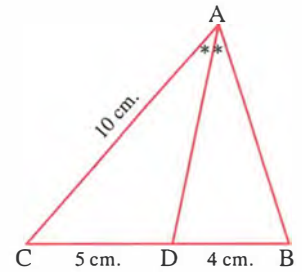
$\overrightarrow{AD}$  bisects  $\angle A$  ,  $AC = 10$  cm.  
 ,  $BD = 4$  cm. ,  $CD = 5$  cm.  
 , then  $AD = \dots\dots\dots$  cm.

(a) 8

(b) 60

(c)  $\sqrt{15}$

(d)  $2\sqrt{15}$



**(25) In the opposite figure :**

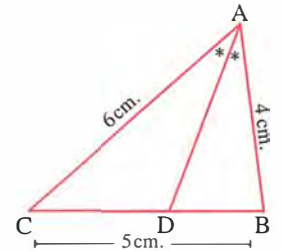
$\overrightarrow{AD}$  bisects  $\angle A$   
 ,  $AB = 4$  cm. ,  $AC = 6$  cm.  
 , then  $DC = \dots\dots\dots$  cm.

(a) 1

(b) 2

(c) 3

(d) 4



**(26)** M is a circle , A is a point on the plane of the circle ,  $MA = 6$  cm. ,  $P_M(A) = -12$  , then the area of the circle =  $\dots\dots\dots$   $\text{cm}^2$

(a)  $4\pi$

(b)  $6\pi$

(c)  $36\pi$

(d)  $48\pi$

**(27) In the opposite figure :**

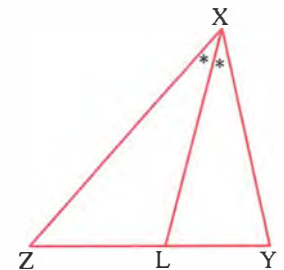
$\overrightarrow{XL}$  bisects  $\angle X$  ,  $LY : LZ = 3 : 5$   
 , then area of  $(\triangle XYL) : \text{area of } (\triangle XLZ) = \dots\dots\dots$

(a)  $3 : 5$

(b)  $5 : 3$

(c)  $9 : 25$

(d)  $25 : 9$



**Second Essay questions**

**Answer the following questions :**

**1** Determine the sign of the function :  $f(x) = x^2 - x - 6$  in the interval  $[-5, 5]$

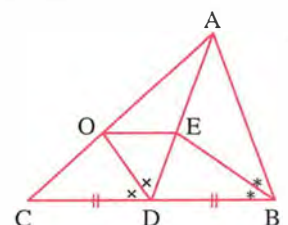
**2 In the opposite figure :**

$AB = AD$  ,  $BD = DC$

$\overrightarrow{BE}$  bisects  $\angle ABD$

$\overrightarrow{DO}$  bisects  $\angle ADC$

**Prove that :**  $\overline{EO} \parallel \overline{DC}$



**14****Beni Suf Governorate****Beni Suf Directorate****First Multiple choice questions****Choose the correct answer from those given :**

- (1) If the curve of the quadratic function  $f$  intersects the  $X$ -axis at the two points  $(5, 0)$  and  $(-1, 0)$ , then the solution set of the equation  $f(X) = 0$  in  $\mathbb{R}$  is .....
- (a)  $\{5, 0\}$  (b)  $\{-1, 0\}$  (c)  $\{-1, 5\}$  (d)  $\{-5, 1\}$
- (2)  $i^{-30} = \dots\dots\dots$
- (a)  $-i$  (b)  $i$  (c)  $-1$  (d)  $1$
- (3)  $(3 + 2i) + (2 - 5i) = \dots\dots\dots$
- (a)  $5 + 2i$  (b)  $5 - 3i$  (c)  $3 - 5i$  (d)  $5 + 3i$
- (4) If the two roots of the equation :  $X^2 - 6X + k = 0$  are equal real roots, then  $k = \dots\dots\dots$
- (a)  $1$  (b)  $6$  (c)  $9$  (d)  $12$
- (5) The two roots of the equation :  $X(X - 2) = 5$  are .....
- (a) two complex and non real roots. (b) two equal real roots.  
(c) two different real roots. (d) 2 and zero.
- (6) The function  $f : f(X) = X^2 - 6X + 9$  is positive in the interval .....
- (a)  $]0, \infty[$  (b)  $] - \infty, 3]$  (c)  $\mathbb{R} - \{0\}$  (d)  $\mathbb{R} - \{3\}$
- (7) The solution set of the inequality :  $X(X - 1) > 0$  in  $\mathbb{R}$  is .....
- (a)  $\{0, 1\}$  (b)  $]0, 1[$  (c)  $[0, 1]$  (d)  $\mathbb{R} - [0, 1]$
- (8) The sign of the function  $f : f(X) = 6 - 2X$  is non positive at .....
- (a)  $X > 3$  (b)  $X \leq 3$  (c)  $X < 3$  (d)  $X \geq 3$
- (9) The angle whose measure is  $-135^\circ$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (10) The measure of the central angle in a circle of radius length 15 cm. and opposite to an arc of length  $5\pi$  cm. equals .....
- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $180^\circ$
- (11) If  $\cos \theta = \frac{1}{2}$ ,  $\sin \theta = \frac{\sqrt{3}}{2}$ , then the measure of angle  $\theta = \dots\dots\dots$
- (a)  $\frac{\pi}{3}$  (b)  $\frac{5\pi}{6}$  (c)  $\frac{5\pi}{3}$  (d)  $\frac{11\pi}{6}$
- (12) If  $\sin(90^\circ - \theta) = \frac{-1}{2}$  where  $\theta$  is the smallest positive angle, then  $\theta = \dots\dots\dots$
- (a)  $60^\circ$  (b)  $120^\circ$  (c)  $240^\circ$  (d)  $300^\circ$

(13) The range of the function  $f : f(\theta) = \sin \theta$  is .....

- (a)  $\{-1, 1\}$  (b)  $[-1, 1]$  (c)  $]-1, 1[$  (d)  $]-\infty, \infty[$

(14) If  $\cos \theta = 0.436$ , where  $\theta$  is the measure of the smallest positive angle, then  $\theta \approx$  .....

- (a)  $64^\circ 9'$  (b)  $115^\circ 51'$  (c)  $244^\circ 9'$  (d)  $295^\circ 51'$

(15) The two similar polygons are congruent if the scale factor  $k$  satisfies .....

- (a)  $k = \frac{1}{2}$  (b)  $k = 1$  (c)  $k > 1$  (d)  $0 < k < 1$

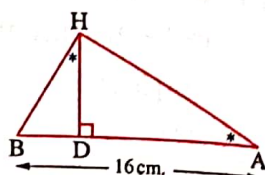
(16) In the opposite figure :

$\triangle ABH$  is a triangle,  $\overline{HD} \perp \overline{AB}$ ,  $m(\angle A) = m(\angle BHD)$

,  $AB = 16$  cm. and  $BD = 4$  cm.

, then the length of  $\overline{BH} =$  ..... cm.

- (a) 4 (b) 8 (c) 12 (d)  $8\sqrt{3}$



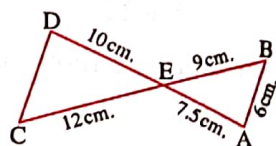
(17) In the opposite figure :

$\overline{AD} \cap \overline{BC} = \{E\}$ ,  $AE = 7.5$  cm.,  $EC = 12$  cm.

,  $BE = 9$  cm.,  $ED = 10$  cm. and  $AB = 6$  cm.

, then the length of  $\overline{CD} =$  ..... cm.

- (a) 4 (b) 8 (c) 12 (d) 16



(18) If the ratio between the surface areas of two similar polygons is  $16 : 25$ , then the ratio between their perimeter is .....

- (a)  $2 : 5$  (b)  $4 : 5$  (c)  $16 : 41$  (d)  $16 : 25$

(19) If  $\triangle ABC \sim \triangle DEF$ , area of  $(\triangle ABC) = 9$  area of  $(\triangle DEF)$  and  $DE = 4$  cm.

, then  $AB =$  ..... cm.

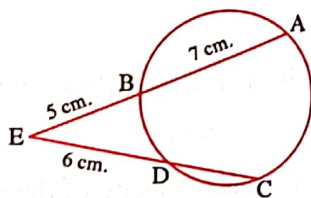
- (a)  $\frac{4}{3}$  (b) 9 (c) 12 (d) 36

(20) In the opposite figure :

If  $AB = 7$  cm.,  $BE = 5$  cm.,  $DE = 6$  cm.

, then  $CD =$  ..... cm.

- (a) 3 (b) 4  
(c) 5 (d) 6



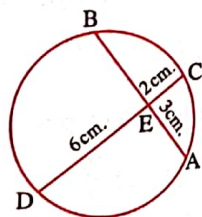
(21) In the opposite figure :

$\overline{CD} \cap \overline{AB} = \{E\}$ ,  $EC = 2$  cm.

,  $DE = 6$  cm.,  $AE = 3$  cm.

, then  $BE =$  ..... cm.

- (a) 5 (b) 3  
(c) 4 (d) 6



(22) In the opposite figure :

$$\overline{AB} \parallel \overline{DE}, \overline{DB} \cap \overline{EA} = \{C\}$$

,  $AC = 6$  cm. ,  $BC = 4$  cm. and  $CD = 3$  cm.

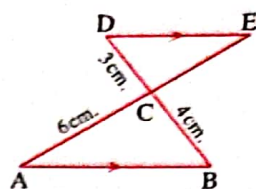
, then  $CE = \dots\dots\dots$  cm.

(a) 3.5

(c) 4.5

(b) 4

(d) 5



(23) In the opposite figure :

$$\overline{CD} \parallel \overline{EF} \parallel \overline{XY}, DF = 15$$
 cm.

,  $FY = 33$  cm. and  $CE = 20$  cm.

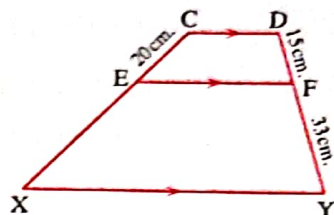
, then  $CX = \dots\dots\dots$  cm.

(a) 21

(c) 48

(b) 44

(d) 64



(24) In the opposite figure :

$\overline{AD}$  bisects the exterior angle of  $\triangle ABC$  at A

,  $AB = 8$  cm. ,  $CB = 6$  cm. and  $AC = 4$  cm.

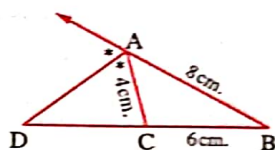
, then  $CD = \dots\dots\dots$  cm.

(a) 2

(b) 4

(c) 6

(d) 8



(25) If M is a circle , A is a point that lies in its plane where  $P_M(A) = 0$  , then A lies .....

(a) inside the circle.

(c) outside the circle.

(b) on the center of the circle.

(d) on the circle.

(26) If N is a circle of diameter length 16 cm. , B is a point lies in its plane where  $NB = 5$  cm.

, then  $P_N(B) = \dots\dots\dots$

(a) - 231

(b) - 39

(c)  $\sqrt{39}$

(d) 39

(27) In the opposite figure :

$\overline{AB}$  is a tangent to a circle at B

,  $m(\widehat{BD}) = 120^\circ$  and  $m(\widehat{BC}) = 60^\circ$

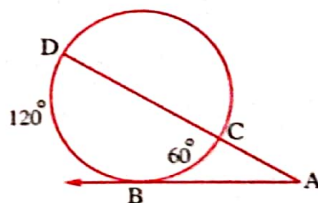
, then  $m(\angle BAD) = \dots\dots\dots$

(a)  $15^\circ$

(c)  $60^\circ$

(b)  $30^\circ$

(d)  $90^\circ$



## Second Essay questions

Answer the following questions :

1 If L and M are the two roots of the equation :  $x^2 - 3x - 5 = 0$  , then find the quadratic equation whose roots are :  $L - 4$  and  $M - 4$

- 2** ABC is a triangle in which :  $AB = 15$  cm. ,  $AC = 9$  cm. ,  $\overrightarrow{AD}$  bisects  $\angle BAC$  and intersects  $\overline{CB}$  at D , if  $CD = 6$  cm. Find the length of each of  $\overline{DB}$  and  $\overline{AD}$

**15****Assiut Governorate****Administration of Distinguished and Governmental Language School****First Multiple choice questions****Choose the correct answer from those given :**

- (1) If the two roots of the equation :  $4x^2 - 12x + c = 0$  are equal , then  $c = \dots\dots\dots$   
 (a) 3 (b) 4 (c) 9 (d) 16
- (2) The simplest form of the  $\tan(360^\circ + \theta) + \cot(270^\circ - \theta) = \dots\dots\dots$   
 (a) zero (b) 2 (c)  $2 \tan \theta$  (d)  $2 \cot \theta$
- (3) The quadratic equation whose roots are :  $i$  ,  $-i$  is  $\dots\dots\dots$   
 (a)  $x^2 - 1 = 0$  (b)  $x^2 + 1 = 0$  (c)  $(x + 1)^2 = 0$  (d)  $(x - 1)^2 = 0$
- (4) If  $\cos \theta > 0$  ,  $\sin \theta < 0$  , then  $\theta$  lies in the  $\dots\dots\dots$  quadrant.  
 (a) first (b) second (c) third (d) fourth.
- (5) If one of the roots of the equation :  $x^2 - (m + 2)x + 3 = 0$  is additive inverse of the other , then  $m = \dots\dots\dots$   
 (a) -3 (b) -2 (c) 2 (d) 3
- (6) The function  $f : f(x) = -3$  is negative in  $\dots\dots\dots$   
 (a)  $]-\infty, -3[$  (b)  $]-3, 3]$  (c)  $]-\infty, \infty[$  (d)  $]-\infty, 0[$
- (7) If polygon ABCD  $\sim$  polygon XYZL , then  $\frac{AB}{BC} = \dots\dots\dots$   
 (a)  $\frac{XZ}{XL}$  (b)  $\frac{AD}{XL}$  (c)  $\frac{XL}{AD}$  (d)  $\frac{XY}{YZ}$
- (8) The ratio between the perimeters of two similar polygons is 4 : 9 , so the ratio between their areas is  $\dots\dots\dots$   
 (a) 4 : 9 (b) 9 : 4 (c) 2 : 3 (d) 16 : 81
- (9) The solution set of inequality :  $(x - 2)(x - 5) < 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$   
 (a)  $\{2, 5\}$  (b)  $]2, 5[$  (c)  $[2, 5]$  (d)  $\mathbb{R} - [2, 5]$
- (10) All  $\dots\dots\dots$  are similar.  
 (a) triangles (b) rectangles. (c) parallelograms (d) squares
- (11) All of the following are measures of angles that lie in the second quadrant except  $\dots\dots\dots$   
 (a) -210 (b)  $120^\circ$  (c)  $-120^\circ$  (d)  $850^\circ$

(12)  $\sqrt{-2} \times \sqrt{-8} = \dots\dots\dots$

- (a) 4 (b) -4 (c) 4i (d) -16

(13) The radian measure of the angle whose measure is  $120^\circ$  in terms of  $\pi$  is  $\dots\dots\dots$

- (a)  $\frac{1}{3}\pi$  (b)  $\frac{2}{3}\pi$  (c)  $\frac{3}{2}\pi$  (d)  $\frac{1}{2}\pi$

(14) The exterior bisector of the vertex of an isosceles triangle is  $\dots\dots\dots$  to the base.

- (a) parallel (b) perpendicular (c) bisects (d) equal

(15) The solution set of the equation :  $x^2 + 9 = 0$  in the set of complex numbers is  $\dots\dots\dots$

- (a)  $\{3, -3\}$  (b)  $\{-3i\}$  (c)  $\{3i, -3i\}$  (d)  $\emptyset$

(16) If  $x = -1$  is one of the two roots of the equation :  $x^2 - kx - 6 = 0$  , then  $k = \dots\dots\dots$

- (a) 5 (b) -5 (c) 6 (d) -6

(17) In the opposite figure :

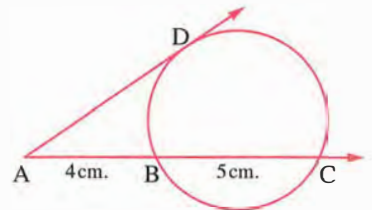
$\overrightarrow{AD}$  is a tangent

,  $AB = 4$  cm.

,  $BC = 5$  cm.

, then  $AD = \dots\dots\dots$  cm.

- (a)  $2\sqrt{5}$  (b) 36 (c) 20 (d) 6



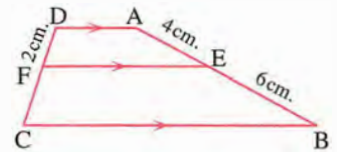
(18) In the opposite figure :

If  $\overrightarrow{AD} \parallel \overrightarrow{EF} \parallel \overrightarrow{BC}$  ,  $AE = 4$  cm.

,  $EB = 6$  cm. ,  $DF = 2$  cm.

, then  $CF = \dots\dots\dots$  cm.

- (a) 2 (b) 3 (c) 4 (d) 5



(19) If  $\overrightarrow{AB}$  is a tangent to the circle M at point B and  $P_M(A) = 25 \text{ cm}^2$  , then  $AB = \dots\dots\dots$

- (a) 5 (b) 10 (c) 15 (d) 25

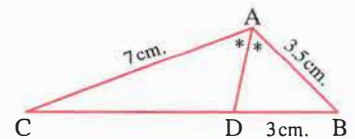
(20) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle BAC$  ,  $AB = 3.5$  cm.

,  $AC = 7$  cm. ,  $BD = 3$  cm.

, then  $CD = \dots\dots\dots$  cm.

- (a) 4.5 (b) 5 (c) 4.9 (d) 6



(21) If  $\tan(180^\circ + \theta) = 1$  where  $\theta$  is the smallest positive angle , then  $\theta = \dots\dots\dots$

- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $135^\circ$

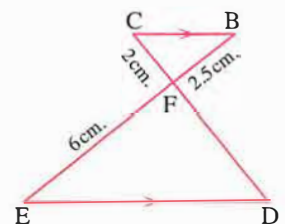
(22) In the opposite figure :

If  $\overrightarrow{ED} \parallel \overrightarrow{CB}$  ,  $CF = 2$  cm.

,  $BF = 2.5$  cm. ,  $FE = 6$  cm.

, then  $FD = \dots\dots\dots$  cm.

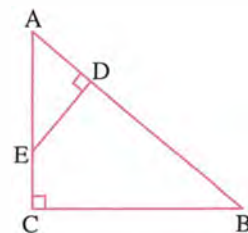
- (a) 3.6 (b) 4 (c) 4.2 (d) 4.8



**(23) In the opposite figure :**

$\triangle ABC \sim \triangle AED$  ,  $m(\angle ADE) = m(\angle C) = 90^\circ$   
 ,  $m(\angle ABC) = 3x + 10^\circ$  ,  $m(\angle AED) = x + 30^\circ$   
 , then  $m(\angle A) = \dots\dots\dots$

- (a)  $50^\circ$  (b)  $40^\circ$   
 (c)  $30^\circ$  (d)  $60^\circ$



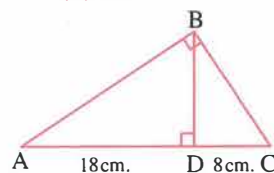
**(24) If  $\theta$  is the measure of an acute angle ,  $\cos(\theta + 25^\circ) = \sin 30^\circ$  , then  $\theta = \dots\dots\dots$**

- (a)  $5^\circ$  (b)  $20^\circ$  (c)  $25^\circ$  (d)  $35^\circ$

**(25) In the opposite figure :**

$m(\angle ABC) = 90^\circ$  ,  $\overline{BD} \perp \overline{AC}$   
 ,  $AD = 18 \text{ cm.}$  ,  $DC = 8 \text{ cm.}$   
 , then  $BD = \dots\dots\dots \text{ cm.}$

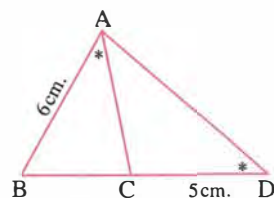
- (a)  $12\sqrt{3}$  (b) 24 (c) 12 (d)  $8\sqrt{3}$



**(26) In the opposite figure :**

$m(\angle D) = m(\angle BAC)$  ,  $AB = 6 \text{ cm.}$   
 ,  $CD = 5 \text{ cm.}$   
 , then  $BC = \dots\dots\dots \text{ cm.}$

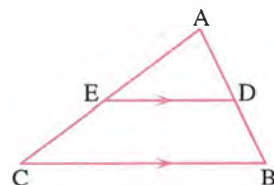
- (a) 3 (b) 4 (c) 5 (d) 6



**(27) In the opposite figure :**

If  $\overline{ED} \parallel \overline{CB}$  ,  $\frac{DE}{BC} = \frac{3}{5}$   
 , then  $\frac{AD}{DB} = \dots\dots\dots$

- (a)  $\frac{5}{3}$  (b) 1.5  
 (c)  $\frac{2}{3}$  (d)  $\frac{3}{4}$



**Second Essay questions**

**Answer the following questions :**

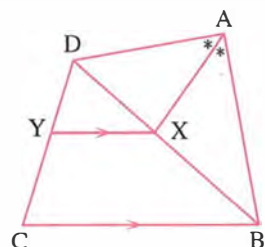
**1** If L and M are the two roots of the equation :  $x^2 - 3x - 4 = 0$

Find the equation whose roots are :  $\frac{1}{L}$  and  $\frac{1}{M}$

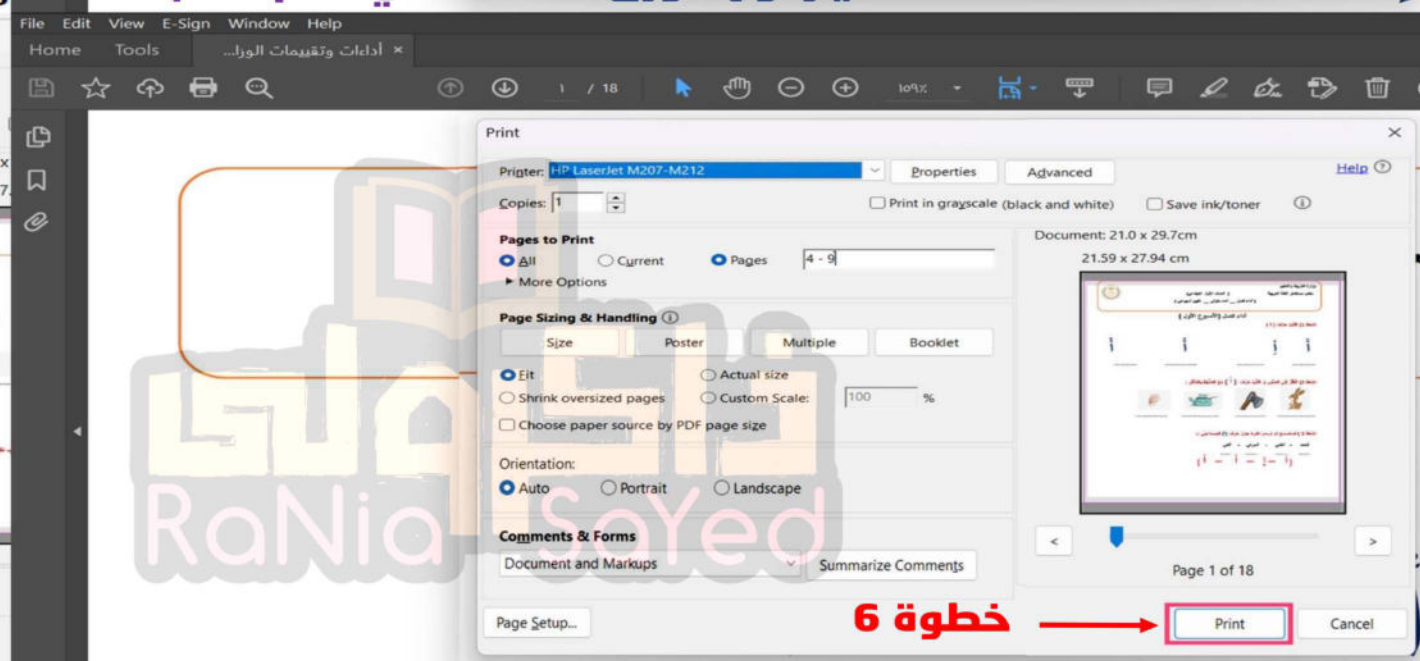
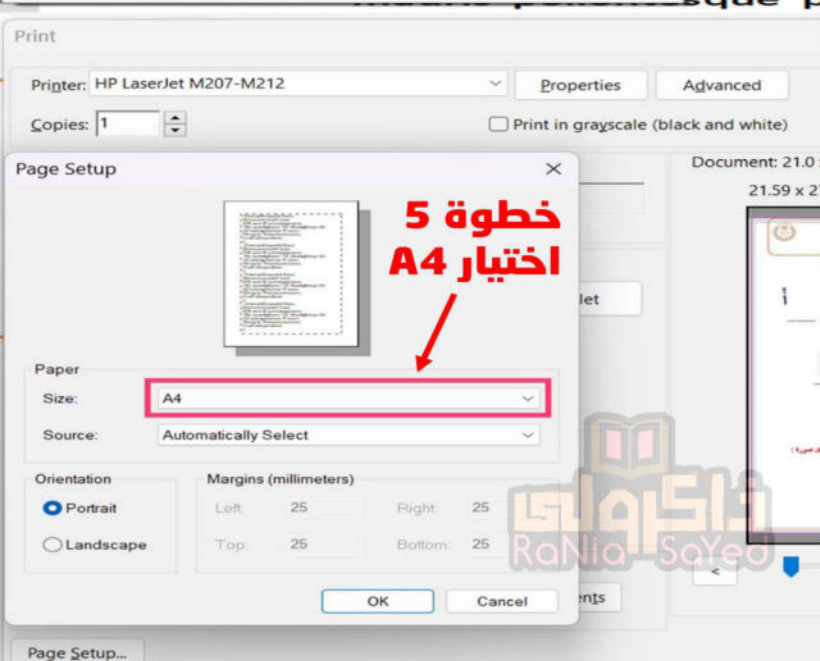
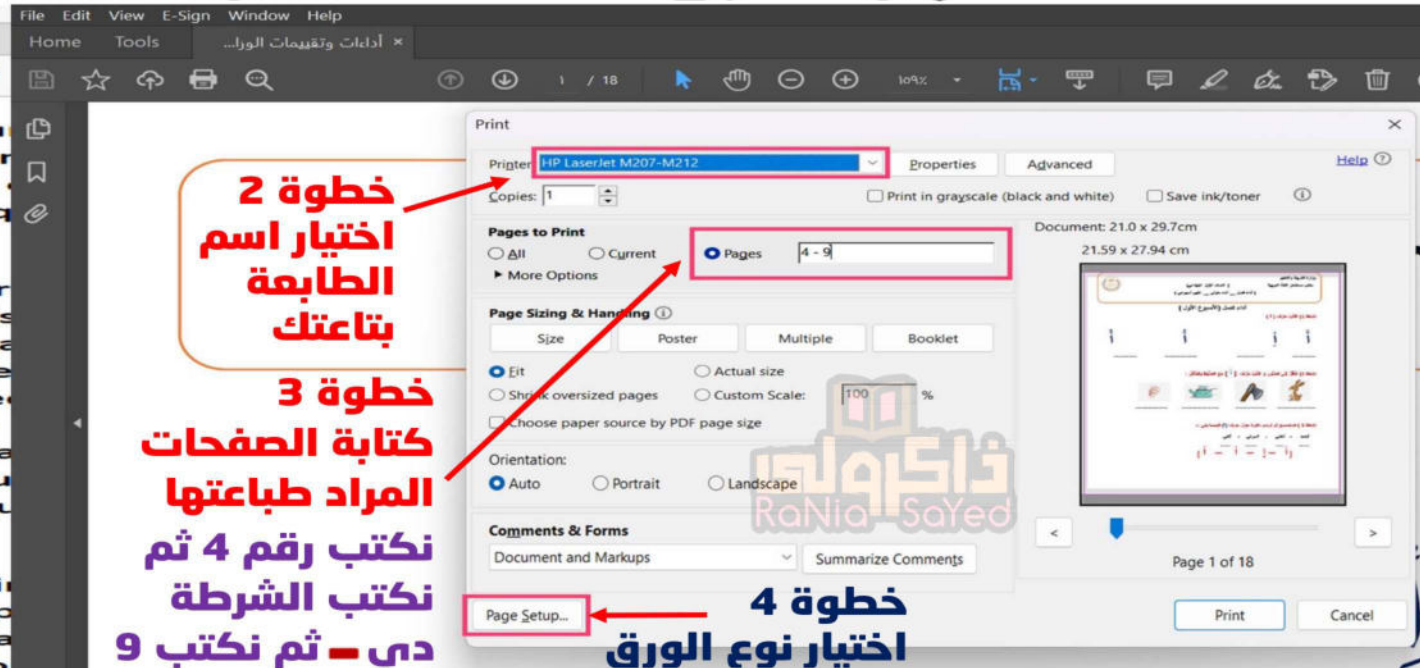
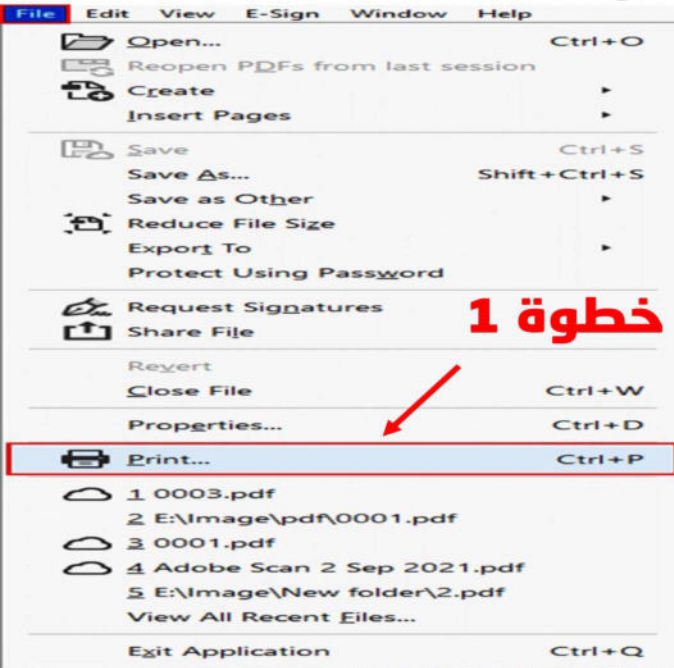
**2 In the opposite figure :**

ABCD is a quadrilateral  
 ,  $\overrightarrow{AX}$  bisects  $\angle BAD$   
 and intersects  $\overline{BD}$  at X ,  $\overline{XY} \parallel \overline{BC}$

**Prove that :**  $\frac{DY}{YC} = \frac{DA}{AB}$



# كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

# امتحانات رقم (2)

## الترم الاول



1

Cairo Governorate

Shoubra Educational Zone  
Mathematics SupervisionInteractive  
tests ①**First Multiple choice questions**

Choose the correct answer from the given ones :

(1) The simplest form of the imaginary number  $i^{43} = \dots\dots\dots$ 

- (a) 1 (b)  $-1$  (c)  $-i$  (d)  $i$

(2) The equation whose roots are :  $2i$  ,  $-2i$  is  $\dots\dots\dots$ 

- (a)  $x^2 + 2 = 0$  (b)  $x^2 + 4 = 0$  (c)  $x^2 = 4$  (d)  $x^2 = 2$

(3) The function  $f : f(x) = x^2 - 4$  is negative when :  $x \in \dots\dots\dots$ 

- (a)  $\mathbb{R} - [-2, 2]$  (b)  $\mathbb{R} - ]-2, 2[$  (c)  $[-2, 2]$  (d)  $]-2, 2[$

(4) The smallest positive measure of the angle of measure  $-240^\circ$  is  $\dots\dots\dots$  in radian.

- (a)  $\frac{2\pi}{3}$  (b)  $\frac{4\pi}{3}$  (c)  $\frac{\pi}{3}$  (d)  $2\pi$

(5) If  $10 \sin x = 6$  , where  $x$  is the greatest positive measure ,  $x \in [0, 2\pi[$   
 , then  $\sec(540^\circ + x) = \dots\dots\dots$ 

- (a)  $-\frac{5}{4}$  (b)  $\frac{5}{4}$  (c)  $-\frac{5}{3}$  (d)  $\frac{3}{5}$

(6) If  $\triangle ABC \sim \triangle DEF$  ,  $BC = 3 EF$  , then the factor of similarity of  $\triangle ABC$  to  $\triangle DEF = \dots\dots\dots$ 

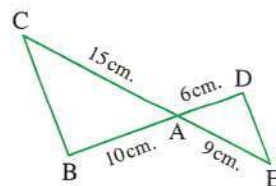
- (a) 3 (b) 1 (c)  $\frac{1}{3}$  (d)  $\frac{2}{3}$

(7) In the opposite figure :

$$\overline{DB} \cap \overline{EC} = \{A\}$$

,  $AE = 9$  cm. ,  $AB = 10$  cm.,  $AD = 6$  cm. ,  $AC = 15$  cm.If the area of  $\triangle ADE = 18$  cm<sup>2</sup>, then the area of  $\triangle ABC = \dots\dots\dots$  cm<sup>2</sup>

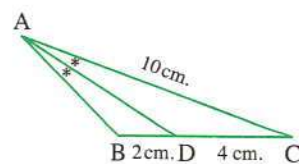
- (a) 225 (b) 30 (c) 54 (d) 50



(8) In the opposite figure :

 $\overrightarrow{AD}$  bisects  $\angle BAC$ ,  $BD = 2$  cm. ,  $DC = 4$  cm.,  $AC = 10$  cm. , then  $AD = \dots\dots\dots$  cm.

- (a)  $\sqrt{42}$  (b)  $\sqrt{58}$  (c) 9 (d) 5

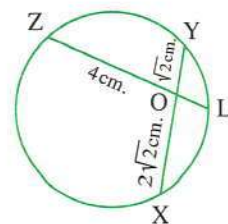


(9) In the opposite figure :

$\overline{XY}$ ,  $\overline{ZL}$  are two intersecting chords at O If  $OY = \sqrt{2}$  cm.

,  $OX = 2\sqrt{2}$  cm. ,  $OZ = 4$  cm. , then  $OL = \dots\dots\dots$  cm.

- (a) 4 (b) 2  
(c) 1 (d)  $\frac{1}{2}$



(10) If  $a + 3i$  ,  $4 - bi$  are two conjugate numbers , then  $a + b = \dots\dots\dots$

- (a) -7 (b) 7 (c) -1 (d) 1

(11) If  $L$  ,  $\frac{1}{L}$  are the roots of the equation :  $aX^2 - 3X + 2 = 0$  , then  $a = \dots\dots\dots$

- (a)  $\frac{1}{3}$  (b)  $\frac{1}{2}$  (c) 3 (d) 2

(12) The function  $f : f(X) = 2X - 3$  is positive when  $\dots\dots\dots$

- (a)  $X > \frac{2}{3}$  (b)  $X < \frac{2}{3}$  (c)  $X > \frac{3}{2}$  (d)  $X < \frac{3}{2}$

(13) The range of the function :  $f(X) = \cos(-2X)$  equals  $\dots\dots\dots$

- (a)  $[-1, 1]$  (b)  $] -1, 1[$  (c)  $[-2, 2]$  (d)  $] -2, 2[$

(14)  $\sin(-\theta) + \frac{\sec 15^\circ}{\csc 75^\circ} + \cos(270^\circ + \theta) = \dots\dots\dots$

- (a) 0 (b) 1 (c) -1 (d)  $\sin \theta$

(15) If the ratio between the areas of two similar polygons is  $1 : 4$  , then the ratio between the lengths of two corresponding sides of them is  $\dots\dots\dots$

- (a)  $1 : 16$  (b)  $1 : 4$  (c)  $1 : 2$  (d)  $2 : 1$

(16) In the opposite figure :

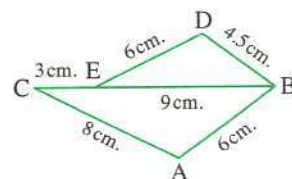
$AB = 6$  cm. ,  $AC = 8$  cm.

,  $CE = 3$  cm. ,  $EB = 9$  cm.

,  $BD = 4.5$  cm. ,  $DE = 6$  cm.

, then the factor of similarity of  $\triangle ABC$  to  $\triangle DBE = \dots\dots\dots$

- (a)  $9 : 16$  (b)  $16 : 9$  (c)  $3 : 4$  (d)  $4 : 3$



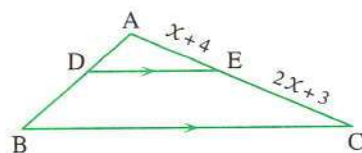
(17) In the opposite figure :

$\overline{DE} \parallel \overline{BC}$

,  $AD : AB = 2 : 5$

, then  $X = \dots\dots\dots$

- (a) 8 (b) 6  
(c) 4 (d) 2



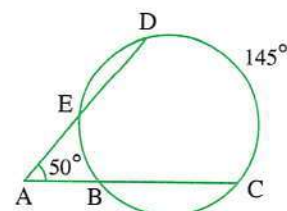
(18) In the opposite figure :

$$m(\angle A) = 50^\circ$$

$$m(\widehat{DC}) = 145^\circ$$

$$m(\widehat{EB}) = (2x - 5)^\circ$$

, then  $x = \dots\dots\dots$



(a) 35

(b) 30

(c) 25

(d) 20

(19) If one of the two roots of the equation :  $x^2 - (k - 3)x + 5 = 0$  is the additive inverse of the other root , then  $k = \dots\dots\dots$

(a) 3

(b) - 3

(c) 0

(d) 5

(20) If the product of the two roots of the equation :  $ax^2 + bx + c = 0$  equals their sum , then  $\dots\dots\dots$

(a)  $a = c$

(b)  $a = b$

(c)  $b = c$

(d)  $b = -c$

(21) The measure of the central angle in a circle of radius length 15 cm. and opposite to an arc of length  $5\pi$  cm. =  $\dots\dots\dots$

(a)  $90^\circ$

(b)  $120^\circ$

(c)  $60^\circ$

(d)  $150^\circ$

(22) The directed angle which its terminal side cuts the unit circle at the point  $(a, b)$  where :  $a < 0$  ,  $b < 0$  lies in the  $\dots\dots\dots$  quadrant.

(a) 4<sup>th</sup>

(b) 3<sup>rd</sup>

(c) 2<sup>nd</sup>

(d) 1<sup>st</sup>

(23) The triangle in which two angles of measures  $55^\circ$  ,  $65^\circ$  is similar to triangle in which two angles of measure  $55^\circ$  ,  $\dots\dots\dots$

(a)  $70^\circ$

(b)  $50^\circ$

(c)  $55^\circ$

(d)  $60^\circ$

(24) If the ratio between the lengths of two corresponding sides of two similar triangles is  $3 : 5$  and the area of the greater triangle =  $100 \text{ cm}^2$  , then the area of the smaller triangle =  $\dots\dots\dots \text{ cm}^2$

(a) 36

(b) 46

(c) 64

(d) 26

(25) If the radius length of the circle M equals 4 cm. and B is a point on the circle , then  $P_M(B) = \dots\dots\dots$

(a) 4

(b) 0

(c) 16

(d) 12

**(26) In the opposite figure :**

If  $CN = x$  ,  $NA = 5x$

$MN = 7$  cm.

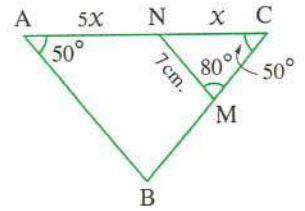
, then  $AB = \dots\dots\dots$  cm.

(a) 42

(b) 35

(c) 28

(d) 21



**(27) In the opposite figure :**

$\overrightarrow{AD}$  bisects  $\angle BAC$  externally

,  $AB = 8$  cm.

,  $BC = 6$  cm.

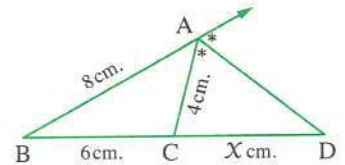
,  $AC = 4$  cm. , then  $x = \dots\dots\dots$  cm.

(a) 9

(b) 8

(c) 7

(d) 6



**Second Essay questions**

**Answer the following questions :**

- 1** Determine the sign of the function :  $f(x) = x^2 - x - 12$  , then find the solution set of the inequality :  $x^2 - 12 > x$

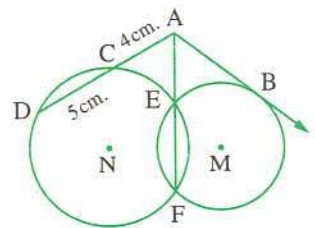
**2 In the opposite figure :**

$AC = 4$  cm.

,  $CD = 5$  cm.

$\overrightarrow{AB}$  touches the circle M at B

Find with proof the length of :  $\overline{AB}$



**2**

**Cairo Governorate**



**El-Salam Educational Zone  
Math's Supervision**

**First Multiple choice questions**



**Interactive  
tests ②**

**Choose the correct answer from the given ones :**

- ( 1 )** The simplest form of the number  $6i^{58}$  is .....

(a) 6

(b) - 6

(c)  $6i$

(d)  $- 6i$

- ( 2 )** The conjugate of the number 9 is .....

(a)  $- 9i$

(b)  $9i$

(c) - 9

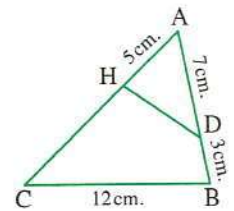
(d) 9

- (3) The simplest form of the number  $\frac{3-2i}{4-3i}$  is .....
- (a)  $\frac{1}{25} + \frac{18}{25}i$  (b)  $\frac{1}{25} - \frac{18}{25}i$  (c)  $\frac{18}{25} + \frac{1}{25}i$  (d)  $\frac{18}{25} - \frac{1}{25}i$
- (4) The quadratic equation which has one of its two roots equal  $(3+4i)$  is .....
- (a)  $x^2 + 6x + 25 = 0$  (b)  $x^2 - 6x - 25 = 0$   
(c)  $x^2 - 6x + 25 = 0$  (d)  $x^2 + 6x - 25 = 0$
- (5) If  $3x^2 + 4x + m - 3 = 0$  is a quadratic equation, and its discriminant = 4, then  $m =$  .....
- (a) -4 (b) 3 (c) -3 (d) 4
- (6) If the two roots of the equation :  $x^2 = k + 5$  are real different, then  $k$  .....
- (a)  $< 5$  (b)  $< -5$  (c)  $> 5$  (d)  $> -5$
- (7) If the product of the two roots of the a quadratic equation :  $2x^2 - 3x + k - 3 = 0$  equals 1, then  $k =$  .....
- (a) 2 (b) 3 (c) 4 (d) 5
- (8) The sign of the function  $f(x) = 6 - 2x$  is positive when  $x$  .....
- (a)  $> 3$  (b)  $< 3$  (c)  $> -3$  (d)  $< -3$
- (9) The angle whose measure  $1920^\circ$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (10) The length of the arc which opposite to a central angle of measure  $\frac{\pi}{3}$ , in a circle of radius length 6 cm. equal .....
- (a)  $\frac{3\pi}{2}$  (b)  $2\pi$  (c)  $3\pi$  (d)  $\frac{5\pi}{2}$
- (11) If the terminal side of a positive angle  $\theta$  in standard position intersects the unit circle at point  $(\frac{\sqrt{3}}{2}, y)$ , where  $0 < \theta < 90^\circ$ , then  $\cot \theta =$  .....
- (a)  $\sqrt{3}$  (b)  $-\sqrt{3}$  (c)  $2\sqrt{3}$  (d)  $\frac{-1}{\sqrt{3}}$
- (12)  $3 \sin \theta \in$  .....
- (a)  $[-1, 1]$  (b)  $[-3, 3]$  (c)  $]-3, 3[$  (d)  $]-1, 1[$
- (13)  $2 \sin \theta = -1$  where  $\pi < \theta < \frac{3\pi}{2}$ , then  $m(\angle \theta) =$  .....
- (a)  $130^\circ$  (b)  $210^\circ$  (c)  $225^\circ$  (d)  $240^\circ$
- (14)  $\sin(\theta - 90^\circ) =$  .....
- (a)  $\sin \theta$  (b)  $\cos \theta$  (c)  $-\sin \theta$  (d)  $-\cos \theta$

**(15) In the opposite figure :**

The figure DHCB is cyclic quadrilateral  
 ,  $AD = 7$  cm. ,  $AH = 5$  cm. ,  $DB = 3$  cm.  
 ,  $BC = 12$  cm. , then  $DH = \dots\dots\dots$  cm.

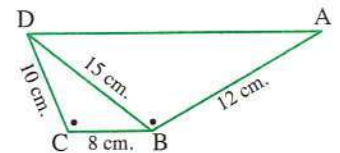
- (a) 14 (b) 9  
 (c) 10 (d) 6



**(16) In the opposite figure :**

$m(\angle ABD) = m(\angle BCD)$   
 $AB = 12$  cm. ,  $BD = 15$  cm. ,  $DC = 10$  cm.  
 ,  $BC = 8$  cm. , then  $AD = \dots\dots\dots$  cm.

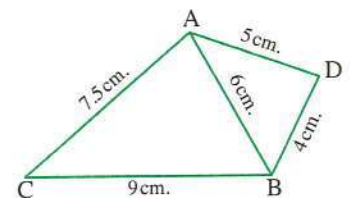
- (a) 13 (b) 15.5  
 (c) 22.5 (d) 20



**(17) In the opposite figure :**

the ratio between the area  
 of  $\triangle DBA$  and area  $\triangle ABC$  is  $\dots\dots\dots$

- (a)  $\frac{2}{3}$  (b)  $\frac{5}{9}$   
 (c)  $\frac{4}{9}$  (d)  $\frac{25}{81}$



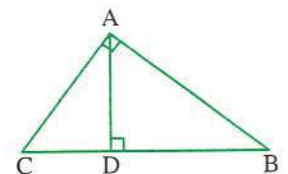
**(18)** Two similar rectangles , the dimensions of the first are 7 cm. , 4 cm. and the perimeter of the second is 22 cm. , then the scale factor of the similarity is  $\dots\dots\dots$

- (a)  $\frac{4}{7}$  (b)  $\frac{7}{4}$  (c)  $\frac{1}{11}$  (d) 1

**(19) In the opposite figure :**

$m(\angle A) = m(\angle ADB) = 90^\circ$   
 , then  $\triangle BDA \sim \triangle \dots\dots\dots$

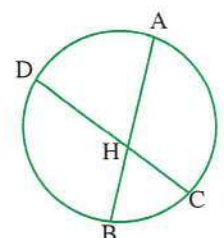
- (a) ADC (b) ABC  
 (c) CAB (d) DAC



**(20) In the opposite figure :**

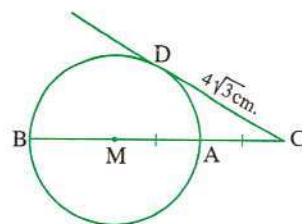
$\overline{AB} \cap \overline{CD} = \{H\}$  ,  $HB = x^2$  cm.  
 $CH = 6$  cm. ,  $HD = 10$  cm.  
 ,  $AH = 15$  cm. , then  $x = \dots\dots\dots$

- (a) 2 (b)  $\pm 2$  (c) 4 (d)  $\pm 4$



**(21) In the opposite figure :** $\overline{AB}$  diameter on the circle M $\overline{CD}$  tangent to the circle at D $CD = 4\sqrt{3}$  cm. ,  $CA = AM$  , then  $AB = \dots\dots\dots$  cm.

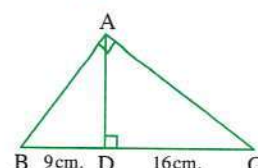
- (a) 4 (b) 16 (c) 8



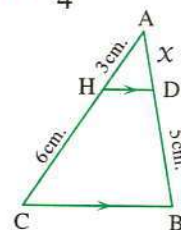
(d) 3

**(22) In the opposite figure :** $m(\angle A) = 90^\circ$  ,  $\overline{AD} \perp \overline{BC}$  ,  $BD = 9$  cm. ,  $DC = 16$  cm., then  $\frac{AB}{AC} = \dots\dots\dots$ 

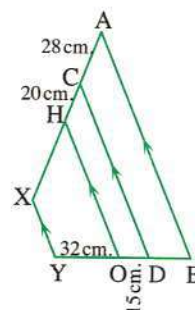
- (a)  $\frac{9}{16}$  (b)  $\frac{9}{25}$  (c)  $\frac{16}{25}$

(d)  $\frac{3}{4}$ **(23) In the opposite figure :** $X = \dots\dots\dots$  cm.

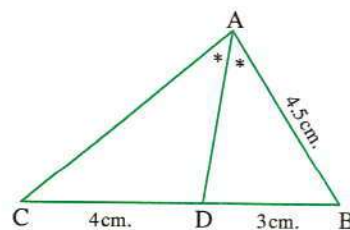
- (a) 2 (b) 2.5  
(c) 3 (d) 3.5

**(24) In the opposite figure :** $\overline{AB} \parallel \overline{CD} \parallel \overline{HO} \parallel \overline{XY}$ , then  $BD = \dots\dots\dots$  cm.

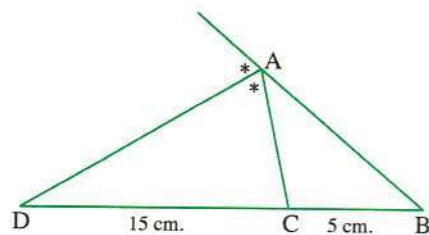
- (a) 33 (b) 28  
(c) 21 (d) 27

**(25) In the opposite figure :** $\overline{AD}$  bisect  $\angle A$  ,  $BD = 3$  cm. ,  $DC = 4$  cm.,  $AB = 4.5$  cm. , then  $AC = \dots\dots\dots$  cm.

- (a) 6 (b) 4.8  
(c) 7 (d) 8

**(26) In the opposite figure :** $\overline{AD}$  bisect the exterior angle at vertex A,  $BC = 5$  cm. ,  $CD = 15$  cm., then  $AB : AC = \dots\dots\dots$ 

- (a) 3 : 1 (b) 1 : 3  
(c) 4 : 1 (d) 4 : 3

**(27) If A is a point outside a circle of centre M ,  $AM = 7$  cm. and  $P_M(A) = 24$** , then the radius length of the circle equal  $\dots\dots\dots$  cm.

- (a) 5 (b) 4 (c) 3 (d) 2

## Second Essay questions

Answer the following questions :

1 Find the solution set of the inequality in  $\mathbb{R}$  :  $x^2 + x - 2 < \text{zero}$

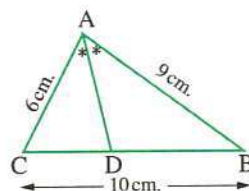
2 In the opposite figure :

$\overrightarrow{AD}$  bisect  $\angle BAC$

$AB = 9 \text{ cm.}$  ,  $AC = 6 \text{ cm.}$

,  $BC = 10 \text{ cm.}$

Find : the length of each  $\overline{BD}$  and  $\overline{AD}$



## 3 Cairo Governorate



El-Khalifa and El-Mokattam Educational Zone  
Mathematics Supervisor

## First Multiple choice questions



Interactive  
tests 3

Choose the correct answer from the given ones :

(1) The conjugate of  $(i - i^2)$  is .....

(a)  $1 - i$

(b)  $1 + i$

(c)  $-i - 1$

(d)  $i - 1$

(2) The arc of length  $2\pi \text{ cm.}$  , in a circle of radius  $12 \text{ cm.}$  is opposite to central angle of measure .....

(a)  $2\pi$

(b)  $\frac{\pi}{6}$

(c)  $\frac{\pi}{3}$

(d)  $\frac{\pi}{2}$

(3) In the opposite figure :

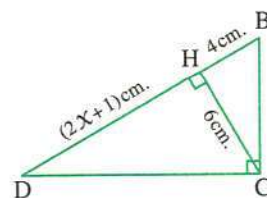
$x = \dots\dots\dots$

(a) 8

(b) 4

(c) 6

(d) 4.8



(4) In the opposite figure :

If area of  $\triangle ABC = 18 \text{ cm}^2$

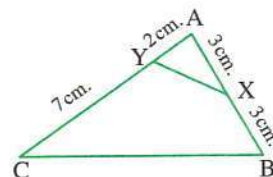
, then area of  $\triangle AXY = \dots\dots\dots \text{cm}^2$

(a) 9

(b) 36

(c) 2

(d) 6



(5) In the opposite figure :

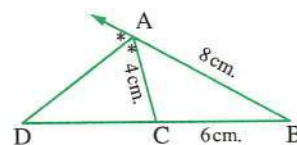
$CD = \dots\dots\dots \text{cm.}$

(a) 2

(b) 6

(c) 4

(d) 8



(6) The sign of function  $f : f(x) = 6 - 2x$  is non positive when .....

- (a)  $x > 3$  (b)  $x \leq 3$  (c)  $x < 3$  (d)  $x \geq 3$

(7) If  $\sin \theta = \frac{-1}{2}$ ,  $\theta$  is the smallest positive angle, then  $\theta = \dots\dots\dots$

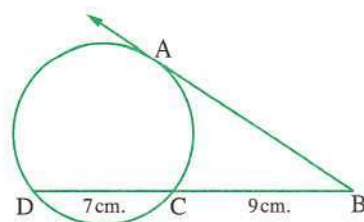
- (a)  $30^\circ$  (b)  $150^\circ$  (c)  $210^\circ$  (d)  $330^\circ$

(8) In the opposite figure :

$\overrightarrow{BA}$  is tangent,  $BC = 9$  cm.,  $CD = 7$  cm.

, then  $AB = \dots\dots\dots$  cm.

- (a) 63 (b) 144  
(c) 12 (d)  $\frac{9}{16}$



(9) If  $x = -1$  is one of the roots of the equation :  $x^2 - kx - 6 = 0$

, then the sum of two roots = .....

- (a)  $-5$  (b) 6 (c)  $-6$  (d) 5

(10) If the range of the function  $f : f(\theta) = 2a \sin \theta$  is the interval  $[-6, 6]$ , then  $a = \dots\dots\dots$

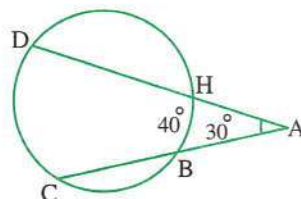
- (a) 3 (b)  $-3$  (c) 6 (d)  $\pm 3$

(11) In the opposite figure :

$m(\angle A) = 30^\circ$ ,  $m(\widehat{BH}) = 40^\circ$

, then  $m(\widehat{CD}) = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $40^\circ$   
(c)  $70^\circ$  (d)  $100^\circ$



(12) M is a circle, A is a point in its plane where  $MA = 6$  cm.,  $P_M(A) = -13$

, then area of circle = .....  $\text{cm}^2$  ( $\pi = \frac{22}{7}$ )

- (a) 154 (b) 44 (c) 144 (d) 7

(13) The solution set of the inequality :  $-x(x+2) \geq 0$  in  $\mathbb{R}$  is .....

- (a)  $\{0, -2\}$  (b)  $[-2, 0]$  (c)  $]-2, 0[$  (d)  $[-2, 2]$

(14) If  $\sin(\theta + 13) = \cos(\theta + 17)$  where  $\theta$  is positive acute angle, then  $\tan \theta = \dots\dots\dots$

- (a)  $\sqrt{3}$  (b)  $\frac{1}{2}$  (c)  $\frac{1}{\sqrt{3}}$  (d)  $\frac{\sqrt{3}}{2}$

(15) If the ratio between areas of two similar triangles equals  $9 : 25$ , and the perimeter of the smaller triangle 60 cm., then perimeter of the greater triangle equals .....

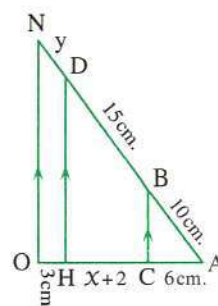
- (a) 60 (b) 80 (c) 100 (d) 120

**(16) In the opposite figure :**

If the lengths are approximated to the nearest cm.

, then  $X + y = \dots\dots\dots$  cm.

- (a) 5 (b) 7  
(c) 11 (d) 12



**(17)** If L and M are the two roots of the equation :  $X^2 - 5X + 7 = 0$  , then the equation whose roots  $L^2$  and  $M^2$  is .....

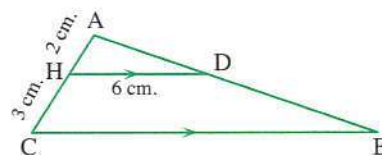
- (a)  $X^2 + 11X + 49 = 0$  (b)  $X^2 - 11X + 49 = 0$   
(c)  $X^2 - 49X + 11 = 0$  (d)  $X^2 + 11X - 49 = 0$

**(18) In the opposite figure :**

$\overline{DH} \parallel \overline{BC}$  ,  $AH = 2$  cm. ,  $HC = 3$  cm.

,  $DH = 6$  cm. , then  $BC = \dots\dots\dots$  cm.

- (a) 9 (b) 15 (c) 12 (d) 10

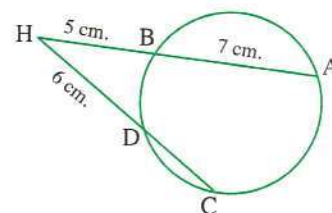


**(19) In the opposite figure :**

$AB = 7$  cm. ,  $BH = 5$  cm. ,  $DH = 6$  cm.

, then length of  $\overline{CD} = \dots\dots\dots$  cm.

- (a) 6 (b) 5  
(c) 4 (d) 3



**(20)** The two roots of equation :  $X(X - 2) = 5$  are .....

- (a) complex and not real. (b) real and equal.  
(c) real and different. (d) 2 and 0

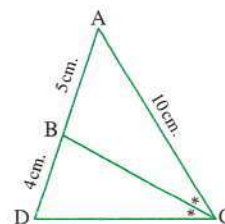
**(21)** If  $\sin \theta = \frac{-1}{2}$  ,  $\cos \theta = \frac{\sqrt{3}}{2}$  , then the angle of measure  $\theta$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

**(22) In the opposite figure :**

$BC = \dots\dots\dots$  cm.

- (a) 8 (b)  $4\sqrt{2}$   
(c)  $2\sqrt{15}$  (d) 6



(23) If one of the roots of the equation :  $aX^2 - 3X + 2 = 0$  is multiplicative inverse of the other , then  $a = \dots\dots\dots$

- (a)  $\frac{1}{3}$  (b)  $\frac{1}{2}$  (c) 2 (d) 3

(24) If the terminal side of angle  $\theta$  in standard position cuts unit circle at the point  $(\frac{-1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$  , then  $\theta = \dots\dots\dots$

- (a)  $45^\circ$  (b)  $135^\circ$  (c)  $225^\circ$  (d)  $315^\circ$

(25) The simplest form of the imaginary number  $i^{45}$  is  $\dots\dots\dots$

- (a)  $i$  (b)  $-1$  (c)  $-i$  (d) 1

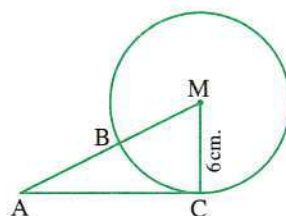
(26) In the opposite figure :

$\overline{AC}$  is tangent to circle M at C

,  $MC = 6$  cm. ,  $P_M(A) = 64$

, then  $AB = \dots\dots\dots$  cm.

- (a) 3 (b) 4  
(c) 5 (d) 6



(27) The rhombus ABCD is similar to rhombus XYZL ,  $m(\angle A) = 60^\circ$  and scale of similarity =  $\frac{1}{2}$  , then  $m(\angle Z) = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $120^\circ$  (c)  $60^\circ$  (d)  $150^\circ$

## Second Essay questions

Answer the following questions :

1 If L and M are the two roots of the equation :  $4X^2 - 6X + a = 0$  and if  $L^2 + M^2 = 7LM$  , find the value of a

2 In the opposite figure :

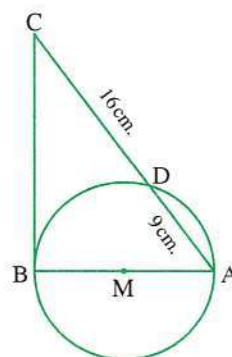
M is a circle ,  $\overline{AB}$  is a diameter

,  $\overline{BC}$  is tangent to circle M at B

and  $\overline{AC}$  intersects the circle M at D

, such that  $CD = 16$  cm. ,  $AD = 9$  cm.

Find length of the radius of the circle.





Interactive tests ④

**First Multiple choice questions****Choose the correct answer from the given ones :**

- (1) If  $X = 3$  is a root of the equation :  $X^2 - 5X + 6 = 0$  , then the other root is .....
- (a) 2 (b) 4 (c) 5 (d) 6
- (2) The simplest form of the imaginary number  $i^{24} = \dots\dots\dots$
- (a) 0 (b) 1 (c) -1 (d) i
- (3) If the roots of the equation :  $X^2 + mX + 9 = 0$  are equal real roots , then  $m = \dots\dots\dots$
- (a) 6 (b) -6 (c)  $\pm 6$  (d) 3
- (4) If one of the two roots of the equation :  $aX^2 + 3X + 5 = 0$  is the multiplicative inverse of the other root , then  $a = \dots\dots\dots$
- (a) 1 (b) 5 (c) 3 (d) 4
- (5) If  $L, M$  are the roots of the equation :  $X^2 - 4X + 3 = 0$  , then  $L + M + LM = \dots\dots\dots$
- (a) 0 (b) 3 (c) 4 (d) 7
- (6) If  $L$  is a root of the equation :  $X^2 + 3X + 2 = 0$  , then  $L^2 + 3L + 2 = \dots\dots\dots$
- (a) 0 (b) 3 (c) 2 (d) 5
- (7) The quadratic equation whose roots are 4 and -4 is .....
- (a)  $X^2 - 16 = 0$  (b)  $X^2 + 16 = 0$  (c)  $X^2 + 2 = 0$  (d)  $X^2 - 2 = 0$
- (8) The function  $f(X) = X^2 - 9$  is negative at  $X \in \dots\dots\dots$
- (a)  $\mathbb{R}$  (b)  $]-3, 3[$  (c)  $]-\infty, -3[$  (d)  $]3, \infty[$
- (9) The angle of measure  $1000^\circ$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (10) If  $\tan X = 1$  , where  $X$  is a positive acute angle , then the measure of angle  $X = \dots\dots\dots^\circ$
- (a) 30 (b) 45 (c) 60 (d) 75
- (11) If  $\sin \theta > 0$  ,  $\cos \theta < 0$  , then  $\theta$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (12)  $\sin 30^\circ + \cos 60^\circ - \cot 45^\circ = \dots\dots\dots$
- (a) 0 (b) 1 (c) 2 (d) 3

- (13) If  $\sin \theta = \cos 2\theta$  ,  $0^\circ < \theta < 90^\circ$  , then  $\theta = \dots\dots\dots^\circ$   
 (a) 45 (b) 30 (c) 60 (d) 75
- (14) The range of the function  $f(\theta) = \cos \theta$  is .....  
 (a)  $[-1, 1]$  (b)  $\{-1, 1\}$  (c)  $]-\infty, \infty[$  (d)  $\emptyset$
- (15) The two similar polygons are congruent if the scale factor  $K$  satisfies .....  
 (a)  $K > 1$  (b)  $K = 1$  (c)  $K < 1$  (d)  $K = 0.5$
- (16) If  $\Delta ABC \sim \Delta XYZ$  ,  $m(\angle A) = 50^\circ$  ,  $m(\angle B) = 60^\circ$  , then  $m(\angle Z) = \dots\dots\dots^\circ$   
 (a) 50 (b) 60 (c) 70 (d) 110
- (17) If  $\Delta ABC \sim \Delta DEF$  ,  $AB = 3$  cm. ,  $DE = 6$  cm. ,  $EF = 8$  cm. , then  $BC = \dots\dots\dots$  cm.  
 (a) 4 (b) 3 (c) 2 (d) 17
- (18) If the ratio between the perimeters of two similar polygons is  $3 : 4$  , then the ratio between their areas is .....  
 (a)  $3 : 4$  (b)  $4 : 3$  (c)  $9 : 16$  (d)  $5 : 6$
- (19) If  $\Delta ABC \sim \Delta XYZ$  ,  $2AB = 3XY$  , then area of  $\Delta ABC$  : area of  $\Delta XYZ = \dots\dots\dots$   
 (a)  $9 : 4$  (b)  $4 : 9$  (c)  $2 : 3$  (d)  $3 : 2$
- (20) If the ratio between the corresponding sides of two similar triangles is  $2 : 5$  if the area of the first triangle is  $16 \text{ cm}^2$  , then the area of the second triangle = .....  $\text{cm}^2$   
 (a) 40 (b) 80 (c) 100 (d) 120
- (21) If the ratio between the areas of two similar polygons is  $16 : 25$  , then the ratio between their two corresponding sides = .....  
 (a)  $2 : 5$  (b)  $4 : 5$  (c)  $16 : 25$  (d)  $4 : 25$
- (22)  $\Delta ABC$  in which  $D \in \overline{AB}$  ,  $E \in \overline{AC}$  ,  $\overline{DE} \parallel \overline{BC}$  ,  $AD = 2$  cm. ,  $DB = 4$  cm. and  $AE = 3$  cm. , then  $EC = \dots\dots\dots$  cm.  
 (a) 2 (b) 3 (c) 4 (d) 6
- (23)  $\Delta ABC$  in which  $D \in \overline{BC}$  ,  $\overline{AD}$  bisects  $\angle BAC$  ,  $AB = 4$  cm. ,  $AC = 8$  cm. and  $BD = 3$  cm. , the  $CD = \dots\dots\dots$  cm.  
 (a) 3 (b) 4 (c) 6 (d) 8
- (24)  $\Delta ABC$  in which  $D \in \overline{BC}$  ,  $\overline{AD}$  bisects  $\angle BAC$  ,  $AB = 8$  cm. ,  $AC = 6$  cm.  $BD = 4$  cm. and  $CD = 3$  cm. , then  $AD = \dots\dots\dots$  cm.  
 (a) 6 (b) 8 (c) 10 (d) 12

- (25) The measure of the angle included between the interior and the exterior bisectors at any vertex of angles of the triangle = .....°  
 (a) 30 (b) 45 (c) 60 (d) 90
- (26) If M is a circle of radius length 3 cm. , A is a point lies in its plane where  $MA = 4$  cm. , then  $P_M(A) =$  .....  
 (a) 16 (b) 9 (c) 7 (d) 25
- (27) If M is a circle , A is a point lies in its plane where  $P_M(A) = 0$  , then the point A lies ..... the circle M.  
 (a) outside (b) inside (c) on (d) on the centre

## Second Essay questions

Answer the following questions :

- 1 Find in  $\mathbb{R}$  the solution set of the inequality :  $x^2 - 5x + 6 < 0$
- 2 ABCD is a quadrilateral in which  $AB = 6$  cm. ,  $BC = 9$  cm. ,  $CD = 6$  cm. ,  $AD = 4$  cm. ,  $\overrightarrow{AE}$  bisects  $\angle A$  and intersects  $\overline{BD}$  at E , prove that :  $\overrightarrow{CE}$  bisects  $\angle BCD$

5

Giza Governorate



Awseem Educational Directorate

## First Multiple choice questions



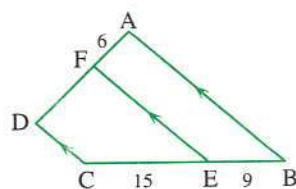
Interactive tests 5

Choose the correct answer from the given ones :

- (1) The conjugate of the number  $(2i - 1)$  is .....  
 (a)  $2i + 1$  (b)  $-2i - 1$  (c)  $-2i + 1$  (d)  $2i - 1$
- (2) The angle whose measure is  $735^\circ$  in the standard position is equivalent to the angle whose measure is .....°  
 (a) 15 (b) 753 (c)  $-245$  (d) 385
- (3) The ratio between the lengths of two corresponding sides of two similar polygons is  $3 : 5$  , then the ratio between their surface areas is .....  
 (a)  $3 : 5$  (b)  $5 : 3$  (c)  $9 : 25$  (d)  $25 : 9$
- (4) In the opposite figure :

$AD =$  .....

- (a) 10 (b) 16  
 (c) 24 (d) 4



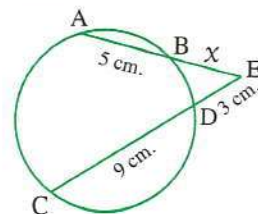
(5) The quadratic equation whose roots are  $4i$ ,  $-4i$  is .....

- (a)  $x^2 = 16i$  (b)  $x^2 - 16 = 0$  (c)  $x^2 + 16 = 0$  (d)  $x^2 i + 16 = 0$

(6) In the opposite figure :

$x =$  .....

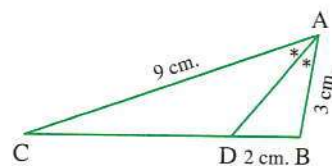
- (a) 3 (b) 4  
(c) 5 (d) 6



(7) In the opposite figure :

CD = ..... cm.

- (a) 6 (b) 4.9  
(c) 5 (d) 4.5



(8)  $3 \cos 30^\circ \tan 60^\circ - 2 \sec 45^\circ \csc 45^\circ =$  .....

- (a) 2 (b)  $\frac{1}{2}$  (c) zero (d) 1

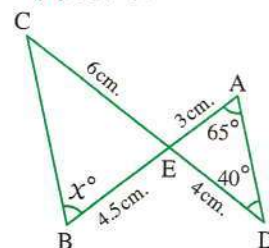
(9) The function  $f(x) = 2x - 1$  is positive when .....

- (a)  $x > \frac{1}{2}$  (b)  $x < \frac{1}{2}$  (c)  $x = \frac{1}{2}$  (d)  $x > 2$

(10) In the opposite figure :

$x =$  .....°

- (a) 40 (b) 75  
(c) 65 (d) 25



(11) If  $L$  is a root of the equation :  $3x^2 + 4x - 7 = 0$

, then the value of  $3L^2 + 4L =$  .....

- (a) zero (b)  $-7$  (c) 14 (d) 7

(12) If the ratio between the lengths of two corresponding sides in two similar polygons is  $3 : 4$  and the perimeter of the smaller is 15 cm. , then the perimeter of the bigger is ..... cm..

- (a) 20 (b)  $\frac{80}{3}$  (c) 27 (d)  $\frac{25}{4}$

(13) The measure of the angle between the interior and the exterior bisectors of an angle of a triangle = .....°

- (a) 45 (b) 90 (c) 135 (d) 180

(14) The arc of length  $2\pi$  in a circle of radius length 8 cm. is opposite to a central angle of radian measure = .....

- (a)  $4\pi$  (b)  $2\pi$  (c)  $\pi$  (d)  $\frac{\pi}{4}$

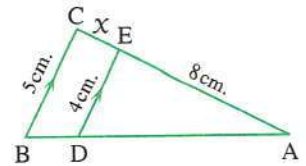
(15) The solution set of the inequality :  $x^2 - 5x + 7 < 0$  in  $\mathbb{R}$  is .....

- (a)  $\emptyset$  (b)  $\mathbb{R}$  (c)  $]-4, 7[$  (d)  $\mathbb{R} - [-4, 7]$

(16) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a) 10 (b) 2  
(c) 6 (d) 9



(17) If the power of point A with respect to circle M is positive then point A lies ..... the circle.

- (a) in the center of (b) on (c) inside (d) outside

(18) The two roots of the equation :  $16x^2 - 8x + 1 = 0$  are .....

- (a) real different (b) complex non-real  
(c) real equal (d) complex and conjugate

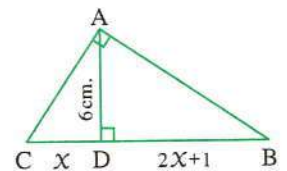
(19) If  $\sin \theta < 0$  and  $\cos \theta > 0$  the angle whose measure is  $\theta$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

(20) In the opposite figure :

$x = \dots\dots\dots$

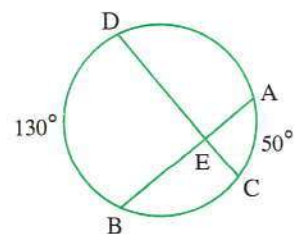
- (a) 4.5 (b) 4  
(c) 6 (d) 36



(21) In the opposite figure :

$m(\angle DEB) = \dots\dots\dots^\circ$

- (a) 100 (b) 90  
(c) 110 (d) 120

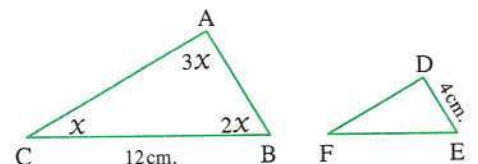


(22) In the opposite figure :

If  $\triangle ABC \sim \triangle DEF$

, then  $EF = \dots\dots\dots$

- (a) 4 (b) 2 (c) 8 (d) 12



(23) If L and M are the two roots of the equation :  $x^2 + x + 1 = 0$

, then  $L + M + LM = \dots\dots\dots$

- (a) zero (b) 1 (c) -1 (d) 2

(24) If  $\cos(270^\circ - \theta) = \frac{1}{2}$  where  $\theta$  is the measure of the smallest positive angle

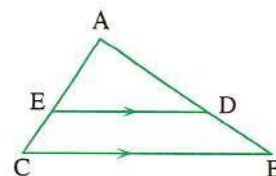
, then  $\theta = \dots\dots\dots^\circ$

- (a) 30 (b) 150 (c) 210 (d) 330

(25) In the opposite figure :

If  $\frac{AD}{DB} = \frac{5}{3}$  , then  $\frac{AC}{EC} = \dots\dots\dots$

- (a)  $\frac{3}{5}$  (b)  $\frac{3}{8}$   
(c)  $\frac{8}{3}$  (d)  $\frac{5}{3}$



(26)  $\frac{\sin 40^\circ}{\cos 50^\circ} + \frac{\tan 35^\circ}{\cot 55^\circ} = \dots\dots\dots$

- (a) zero (b) 1 (c) -1 (d) 2

(27) The function  $f(x) = ax^2 + bx + c$  has one sign in  $\mathbb{R}$  when .....

- (a)  $b^2 - 4ac < 0$  (b)  $b^2 - 4ac = 0$   
(c)  $b^2 - 4ac \geq 0$  (d)  $b^2 - 4ac > 0$

## Second Essay questions

Answer the following questions :

1 Find the S.S. in  $\mathbb{R}$  for the inequality :  $x^2 - 4x - 12 > 0$

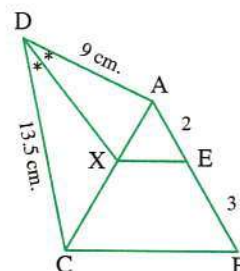
2 In the opposite figure :

ABCD is a quadrilateral in which  $\overrightarrow{DX}$  bisects  $\angle D$

$AE : EB = 2 : 3$

,  $AD = 9$  cm. ,  $DC = 13.5$  cm.

Prove that :  $\overline{EX} \parallel \overline{BC}$



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## First Multiple choice questions

Choose the correct answer from the given ones :

(1)  $(1 + i)^8 = \dots\dots\dots$

- (a) 16 (b)  $16i$  (c) -16 (d)  $-16i$

(2) The ratio between two corresponding sides of two similar triangles is 4 : 5 and sum of their two areas is  $410 \text{ cm}^2$  , then the difference their areas = .....  $\text{cm}^2$

- (a) 90 (b) 80 (c) 50 (d) 20

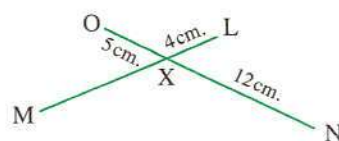


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(3) In the opposite figure :

The points L, M, N, O lying on the same circle if XM = ..... cm.

- (a) 10 (b) 12 (c) 15 (d) 20



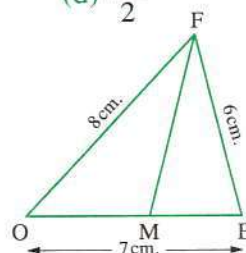
(4) If  $\tan(90^\circ + X) = \sin 390^\circ \cos(-60^\circ) + \cos 30^\circ \sin 120^\circ$ , then  $\tan X = \dots\dots\dots$

- (a) -1 (b) 0.5 (c) 1 (d)  $\frac{\sqrt{3}}{2}$

(5) In the opposite figure :

length of  $\overline{MO} = \dots\dots\dots$  cm.

- (a) 3 (b) 4  
(c) 5 (d) 6



(6) If the product of two root of the equation :  $LX^2 + mX + c = 0$  equal zero

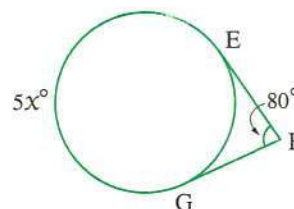
, then ..... = zero

- (a) L (b) m (c) c (d) L + m

(7) In the opposite figure :

$X = \dots\dots\dots^\circ$

- (a) 250 (b) 160  
(c) 52 (d) 16



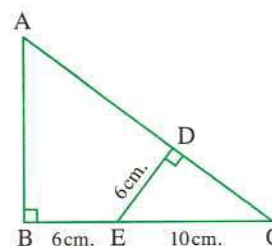
(8) Measure of the central angle opposite to an arc its length  $4\pi$  cm. in a circle its circumference  $24\pi$  cm. equals .....°

- (a) 30 (b) 60 (c) 120 (d) 180

(9) In the opposite figure :

AD = ..... cm.

- (a) 15 (b) 9.6  
(c) 12 (d) 4



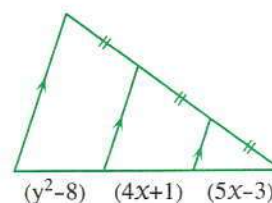
(10) S.S. of  $X^2 + 1 < 0$  in  $\mathbb{R}$  is .....

- (a)  $\mathbb{R}$  (b)  $\mathbb{R} - [-1, 1]$  (c)  $[-1, 1]$  (d)  $\emptyset$

(11) In the opposite figure :

$y > 0$ ,  $XY = \dots\dots\dots$

- (a) 9 (b) 12  
(c) 20 (d) 30



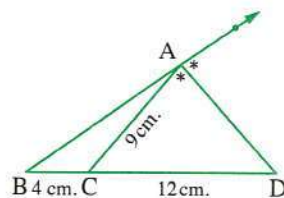
(12) If  $\sec 2\theta = \csc 4\theta$ ,  $\theta$  is acute angle, then  $\tan 3\theta = \dots\dots\dots$

- (a) 1 (b)  $\frac{1}{2}$  (c) -1 (d) zero

(13) In the opposite figure :

AD = ..... cm.

- (a)  $2\sqrt{21}$  (b) 15  
(c)  $2\sqrt{15}$  (d) 6



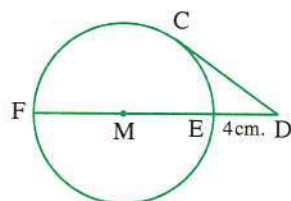
(14) If the product of the two roots of the equation :  $2x^2 + 7kx + 4k = 0$  equals the sum of the two roots of the equation :  $x^2 - (k+4)x = 0$ , then  $k = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 4

(15) In the opposite figure :

If  $P_M(D) = 36$ , then the circumference of the circle M equals ..... cm.

- (a)  $\pi$  (b)  $5\pi$   
(c)  $10\pi$  (d)  $36\pi$



(16) The two roots of  $7x^2 + 14x + c = 0$  real different when  $c \in \dots\dots\dots$

- (a)  $\mathbb{R}$  (b)  $]7, \infty[$  (c)  $[7, \infty[$  (d)  $] -\infty, 7[$

(17) Ratio between two areas of two similar polygons 16 : 25 length of side of smaller one is 4 cm., then the length of the corresponding side in greater one is ..... cm.

- (a) 25 (b) 16 (c) 5 (d)  $\frac{16}{25}$

(18) The maximum value of function  $f(x) = \sin\left(\frac{\pi}{4} + x\right)$  when  $x = \dots\dots\dots$

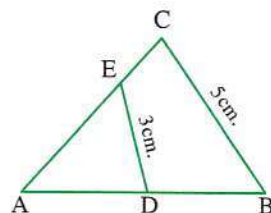
- (a)  $-\frac{\pi}{2}$  (b)  $\frac{\pi}{2}$  (c)  $\frac{\pi}{4}$  (d) zero

(19) In the opposite figure :

$\triangle ADE \sim \triangle ACB$  are of  $\triangle ADE = 90 \text{ cm}^2$

, then area of BCED = .....  $\text{cm}^2$

- (a) 20 (b) 50  
(c) 160 (d) 250



(20) If  $\theta$  is an angle in standard position and its terminal side cuts the unit circle

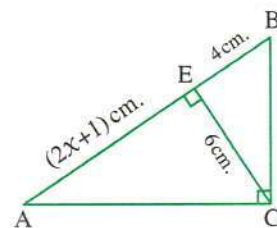
in  $\left(\frac{2}{3}, \frac{\sqrt{5}}{3}\right)$ , then  $\cos(90 - \theta) + \cot(2\pi - \theta) = \dots\dots\dots$

- (a) 1 (b) zero (c)  $-\frac{\sqrt{5}}{3}$  (d)  $-\frac{\sqrt{5}}{15}$

(21) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a) 2 (b) 4  
(c) 6 (d) 8



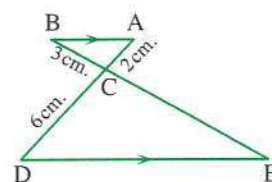
(22) If  $L$  is one of the two roots of the equation :  $x^2 - 3x - 28 = 0$ , then  $L^2 - 3L = \dots\dots\dots$

- (a) -56 (b) 28 (c) 8 (d) 56

(23) In the opposite figure :

$EC = \dots\dots\dots$  cm.

- (a) 2 (b) 3  
(c) 9 (d) 10



(24) The general solution of  $\tan 3\theta = \cot 2\theta$  is  $\dots\dots\dots$

- (a)  $\frac{\pi}{10} + \frac{\pi}{5}n$  (b)  $\frac{\pi}{5} + \pi n$  (c)  $\frac{\pi}{10} + \frac{2\pi}{5}n$  (d)  $\frac{\pi}{2} + \pi n$

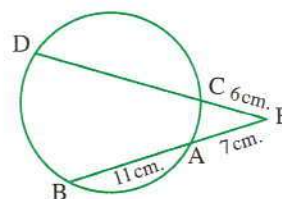
(25)  $f(x) = 4x - 3 - x^2$  is non-negative when  $x \in \dots\dots\dots$

- (a)  $\{1, 3\}$  (b)  $\mathbb{R} - \{1, 3\}$  (c)  $[1, 3]$  (d)  $\mathbb{R} - [1, 3]$

(26) In the opposite figure :

$CD = \dots\dots\dots$  cm.

- (a) 12 (b) 13  
(c) 14 (d) 15



(27) The quadratic equation which one of its two roots equals  $i$  is  $\dots\dots\dots$

- (a)  $x^2 - 2 = 0$  (b)  $x^2 + 1 = 0$  (c)  $2 - x^2 = 0$  (d)  $1 - x^2 = 0$

## Second Essay questions

Answer the following questions :

1 If  $\frac{2}{L}$ ,  $\frac{2}{m}$  two roots of the equation :  $4x^2 + 3x - 2 = 0$ , form equation its two roots  $L$ ,  $M$

2 In the opposite figure :

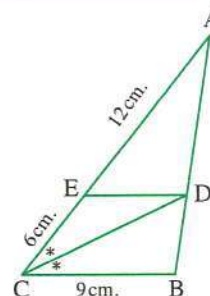
$\overline{DC}$  bisects  $\angle ACB$

,  $AE = 12$  cm.

,  $CE = 6$  cm.

,  $BC = 9$  cm.

Prove that :  $\overline{DE} \parallel \overline{BC}$





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**First Multiple choice questions**

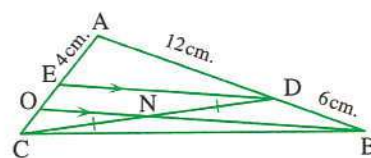
**Choose the correct answer from the given ones :**

- (1) If one of the two roots of :  $X^2 - (k - 5)X + 10 = 0$  is additive inverse of the other , then  $K = \dots\dots\dots$
- (a) 5 (b) 2 (c) -2 (d) -5
- (2) The function  $f(X) = 2X - 6$  is positive in the interval  $\dots\dots\dots$
- (a)  $]-\infty, 3[$  (b)  $]-\infty, 2[$  (c)  $]2, \infty[$  (d)  $]3, \infty[$
- (3) The quadratic equation whose two roots are  $(2 + i)$  ,  $(2 - i)$  is  $\dots\dots\dots$  (where  $i^2 = -1$ )
- (a)  $X^2 - 2X + 2 = 0$  (b)  $X^2 + 2X + 2 = 0$   
(c)  $X^2 - 4X + 5 = 0$  (d)  $X^2 + 4X + 5 = 0$
- (4)  $i + i^2 + i^3 + i^4 + \dots + i^{2023} = \dots\dots\dots$  where  $i^2 = -1$
- (a) i (b) -i (c) 1 (d) -1
- (5) If the roots of the equation :  $X^2 - 4X + k = 0$  are real , then  $\dots\dots\dots$
- (a)  $k \geq 4$  (b)  $k \leq 4$  (c)  $k > 4$  (d)  $k < 4$
- (6) If  $X - 2 - 10i = 5 - 3yi + 2i$  , then  $X + y = \dots\dots\dots$
- (a) -3 (b) 3 (c) 10 (d) 11
- (7) The solution set of the inequality :  $X^2 - 6X + 9 < 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$
- (a)  $\emptyset$  (b)  $\mathbb{R}$  (c)  $]-\infty, 3[$  (d)  $]3, \infty[$
- (8) If L and M are the two roots of the equation :  $X^2 - 6X + 1 = 0$  , then numerical value of  $(L - 1)(M + 1)(L - 5)(M - 7) = \dots\dots\dots$
- (a) 40 (b) 1 (c) -32 (d) -40
- (9) The smallest positive measure of the angle  $-750^\circ = \dots\dots\dots$  in radian.
- (a)  $\frac{5\pi}{6}$  (b)  $\frac{7\pi}{6}$  (c)  $\frac{11\pi}{6}$  (d)  $\frac{13\pi}{6}$
- (10) The minimum value of the function  $f(X) = 2 \sin 3X$  is  $\dots\dots\dots$
- (a) -3 (b) -2 (c) 2 (d) 3
- (11) The measure of the central angle which drawn in a circle its radius 10 cm. and subtended arc of length  $2\pi = \dots\dots\dots^\circ$
- (a) 30 (b) 36 (c) 45 (d) 60

- (12) The directed angle in standard position which has terminal side intersects the unit circle at the point  $(a, b)$  where  $a > 0$  and  $b < 0$ , then it lies in the ..... quadrant.  
 (a) first (b) second (c) third (d) fourth
- (13) If  $14\theta = \pi$ , then the numerical value of  $\frac{\cos 3\theta}{\sin 4\theta} + \frac{\tan \theta}{\cot 6\theta} + \frac{\cos 5\theta}{\cos 9\theta} = \dots\dots\dots$   
 (a)  $-3$  (b)  $0$  (c)  $1$  (d)  $3$
- (14) If  $\tan 25^\circ = k$ , then  $\frac{\cot 205^\circ + \cot 295^\circ}{1 + \tan 335^\circ} = \dots\dots\dots$   
 (a)  $\frac{1}{k} - 1$  (b)  $1 + \frac{1}{k}$  (c)  $1 - k^2$  (d)  $k^2 - k$
- (15) Two congruent polygons their scale factor is  $k$ , then .....  
 (a)  $k < 1$  (b)  $k > 1$  (c)  $k = 1$  (d)  $0 < k < 1$
- (16) Two similar polygons, the ratio between two corresponding sides is  $2 : 3$ , then the ratio between their areas = .....  
 (a)  $2 : 3$  (b)  $3 : 2$  (c)  $4 : 6$  (d)  $4 : 9$
- (17) The interior and exterior bisectors of an angle of triangle include between them an angle of measure .....°  
 (a)  $60$  (b)  $90$  (c)  $120$  (d)  $150$

(18) In the opposite figure :

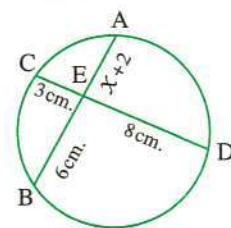
$\overline{DE} \parallel \overline{BO}$  and  $N$  is the midpoint of  $\overline{DC}$   
 ,  $AD = 12$  cm. ,  $DB = 6$  cm. ,  $AE = 4$  cm.  
 , then the length of  $\overline{OC} = \dots\dots\dots$  cm.



- (a)  $5$  (b)  $4$  (c)  $3$  (d)  $2$

(19) In the opposite figure :

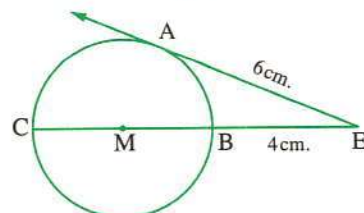
$\overline{AB} \cap \overline{CD} = \{E\}$ ,  $CE = 3$  cm.  
 ,  $EB = 6$  cm. ,  $ED = 8$  cm. , then  $AE = x + 2$  cm.  
 , then  $x = \dots\dots\dots$



- (a)  $4$  (b)  $3$  (c)  $2$  (d)  $1$

(20) In the opposite figure :

$\overline{EA}$  is a tangent to the circle at  $A$   
 ,  $AE = 6$  cm. ,  $EB = 4$  cm.  
 , then the circumference of the circle = .....  $\pi$

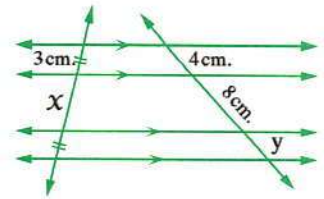


- (a)  $5$  (b)  $6$  (c)  $10$  (d)  $15$

(21) In the opposite figure :

$$\frac{x}{y} = \dots\dots\dots$$

- (a)  $\frac{1}{3}$  (b)  $\frac{1}{2}$   
(c) 1 (d)  $\frac{3}{2}$

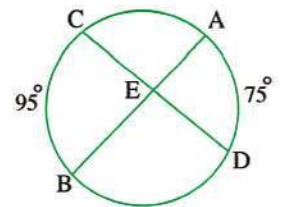


(22) In the opposite figure :

$$\overline{AB} \cap \overline{CD} = \{E\}$$

$$\text{, then } m(\angle AED) = \dots\dots\dots^\circ$$

- (a) 85 (b) 80  
(c) 75 (d) 60



(23) In the opposite figure :

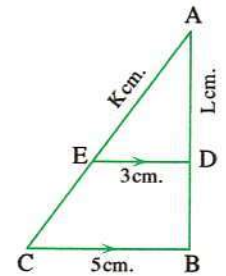
$$\overline{DE} \parallel \overline{BC}, AD = L \text{ cm.}$$

$$\text{, AE} = k \text{ cm. , DE} = 3 \text{ cm. , BC} = 5 \text{ cm.}$$

$$\text{, where } L + k = 9 \text{ cm.}$$

$$\text{, then the perimeter of } \triangle ABC = \dots\dots\dots \text{ cm.}$$

- (a) 12 (b) 15 (c) 20 (d) 24



(24) A circle has radius length 10 cm. , A is a point in its plane where AM = 10 cm.

$$\text{, then } P_M(A) = \dots\dots\dots$$

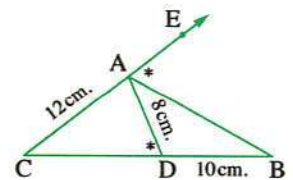
- (a) 0 (b) 25 (c) 75 (d) 100

(25) In the opposite figure :

$$m(\angle ADC) = m(\angle BAE)$$

$$\text{, then the length of } \overline{AB} = \dots\dots\dots \text{ cm.}$$

- (a) 9 (b) 12  
(c) 15 (d) 16



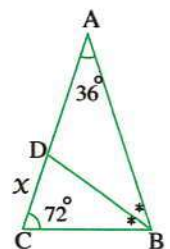
(26) In the opposite figure :

$$\text{If the length of } \overline{CD} = x \text{ cm.}$$

$$\text{, BC} = 2 \text{ cm. and } \overline{BD} \text{ bisects } \angle B$$

$$\text{, then } x^2 + 2x = \dots\dots\dots$$

- (a) 2 (b) 4 (c) 6 (d) 8



(27) In the opposite figure :

If  $z = x + y$

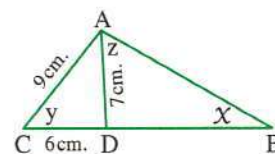
, then the length of  $\overline{BD} = \dots\dots\dots$  cm.

(a) 12

(b) 15

(c) 18

(d) 21



## Second Essay questions

Answer the following questions :

1 If L and M are the roots of the equation :  $x^2 - 5x + k = 0$  and  $3L + 2M = 7$

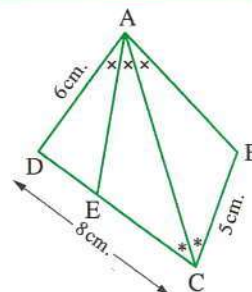
Find : the value of k

2 In the opposite figure :

AD = 6 cm. , CD = 8 cm.

and BC = 5 cm. , where  $E \in \overline{CD}$

Find : the length of  $\overline{CE}$  ,  $\overline{AC}$  ,  $\overline{AE}$



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## First Multiple choice questions

Choose the correct answer from the given ones :

(1) The simplest form of the imaginary number  $i^{39}$  is .....

(a) -1

(b) 1

(c) -i

(d) i

(2) If the two roots of the equation :  $x^2 - kx + 25 = 0$  are real equal , then k = .....

(a) -10

(b) 10

(c) 5

(d)  $\pm 10$

(3) If L and M are the roots of the equation :  $x^2 - 3x + 5 = 0$  , then the value of  $L^2 + M^2 = \dots\dots\dots$

(a) -2

(b) 3

(c) 5

(d) -1

(4) If one of the two roots of the equation :  $x^2 - (k+3)x + 4 = 0$  is the additive inverse of the other root , then k = .....

(a) -4

(b) 3

(c) 4

(d) -3



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(5) If  $L$  and  $M$  are the roots of the equation :  $X^2 - 5X + 7 = 0$  , then the value of the expression :  $\frac{12}{L^2 - 5L + 4} = \dots\dots\dots$

- (a)  $-11$  (b)  $-3$  (c)  $-4$  (d)  $-2$

(6) The sign of function  $f : f(X) = -X + 3$  positive if  $X \in \dots\dots\dots$

- (a)  $]\infty, 3]$  (b)  $]-\infty, 3]$  (c)  $]\infty, 3[$  (d)  $]-\infty, 3[$

(7) The solution set of the inequality :  $X(X-1) > 0$  in  $\mathbb{R} \dots\dots\dots$

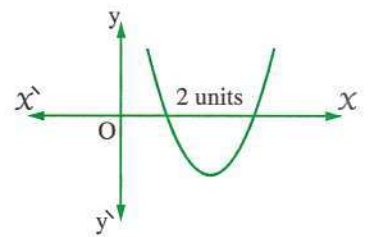
- (a)  $\{0, 1\}$  (b)  $[0, 1]$  (c)  $\mathbb{R} - ]0, 1[$  (d)  $\mathbb{R} - [0, 1]$

(8) The opposite figure represents the curve of the function

$$f : f(X) = X^2 - 8X + k + 1$$

, then  $k = \dots\dots\dots$

- (a)  $14$  (b)  $-14$   
(c)  $8$  (d)  $-8$



(9) The angle with measure  $-120$  in standard position lies in the  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

(10) The measure of the central angle in a circle of radius length  $15$  cm. and opposite to an arc of length  $5\pi$  cm. equal  $\dots\dots\dots$

- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $180^\circ$

(11) If  $\theta \in ]0, \frac{\pi}{2}[$  ,  $\cos \theta = \frac{3}{5}$  , then  $\csc \theta \sin \theta - \tan \theta \csc \theta = \dots\dots\dots$

- (a)  $0$  (b)  $1$  (c)  $\frac{-3}{2}$  (d)  $\frac{-2}{3}$

(12) If  $\tan \theta = \cot 2\theta$  ,  $0^\circ < \theta < 90^\circ$  , then  $\sin \theta + \cos 2\theta = \dots\dots\dots$

- (a)  $1$  (b)  $-1$  (c)  $2$  (d)  $\frac{1}{4}$

(13) The range of the function  $f : f(X) = 4 \sin 2X$  where  $X \in [0, 2\pi]$  is  $\dots\dots\dots$

- (a)  $]-2, 2[$  (b)  $[-2, 2]$  (c)  $]-4, 4[$  (d)  $[-4, 4]$

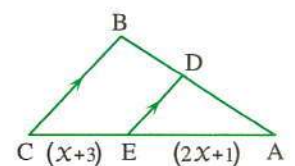
(14)  $\cos(270 - \theta) + \sin(180 - \theta) = \dots\dots\dots$

- (a)  $2 \sin \theta$  (b)  $2 \cos \theta$  (c)  $0$  (d)  $1$

(15) In the opposite figure :

If  $AD : AB = 3 : 5$  , then  $X = \dots\dots\dots$

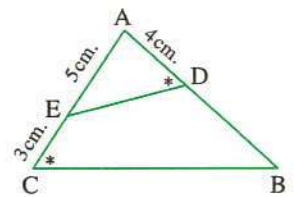
- (a)  $5$  (b)  $3$   
(c)  $4$  (d)  $7$



(16) In the opposite figure :

If  $m(\angle C) = m(\angle ADE)$   
 , then  $DB = \dots\dots\dots$  cm.

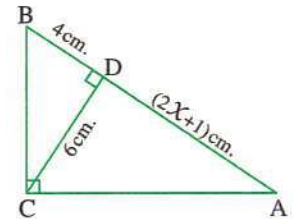
- (a) 4 (b) 5  
 (c) 6 (d) 7



(17) In the opposite figure :

$x = \dots\dots\dots$

- (a) 4 (b) 8  
 (c) 6 (d) 4.8



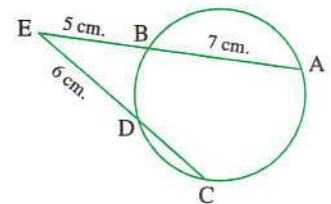
(18) The ratio between the lengths of two corresponding sides of two similar polygon is  $5 : 3$  and the difference between their areas is  $32 \text{ cm}^2$  , then the area of the smaller polygon is  $\dots\dots\dots \text{ cm}^2$

- (a) 18 (b) 50 (c) 32 (d) 16

(19) In the opposite figure :

$CD = \dots\dots\dots$  cm.

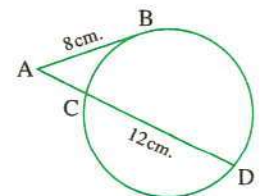
- (a) 4 (b) 5  
 (c) 6 (d) 3



(20) In the opposite figure :

$\overline{AB}$  is a tangent to the circle. If  $CD = 12 \text{ cm}$  ,  $AB = 8 \text{ cm}$  , then  $AC = \dots\dots\dots$  cm.

- (a) 8 (b) 12  
 (c) 6 (d) 4



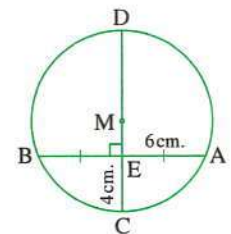
(21) In the opposite figure :

$\overline{CD}$  is a diameter

,  $AE = 6 \text{ cm}$  ,  $CE = 4 \text{ cm}$ .

, then the radius length of the circle M =  $\dots\dots\dots$  cm.

- (a) 9 (b) 4.5 (c) 6

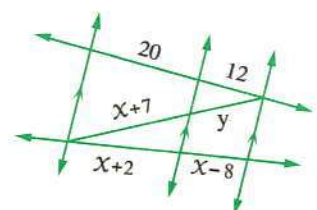


(d) 6.5

(22) In the opposite figure :

$x + y = \dots\dots\dots$

- (a) 23 (b) 18  
 (c) 41 (d) 51

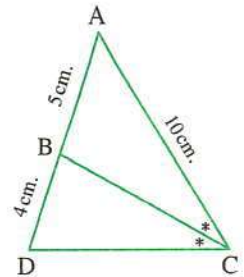


(23) In the opposite figure :

$\overrightarrow{CB}$  bisects  $\angle ACD$

$CB = \dots\dots\dots$  cm.

- (a) 8 (b)  $4\sqrt{2}$   
(c)  $2\sqrt{15}$  (d) 6

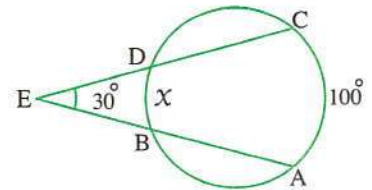


(24) In the opposite figure :

$m(\widehat{AC}) = 100^\circ$

, then the value of  $x = \dots\dots\dots$

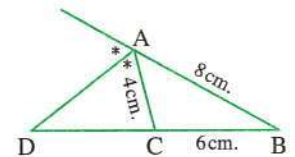
- (a)  $30^\circ$  (b)  $40^\circ$   
(c)  $50^\circ$  (d)  $60^\circ$



(25) In the opposite figure :

$CD = \dots\dots\dots$  cm.

- (a) 2 (b) 4  
(c) 6 (d) 8

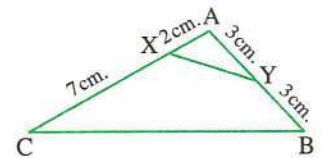


(26) In the opposite figure :

The area of  $\triangle ABC = 45 \text{ cm}^2$

, then the area of  $\triangle AYX = \dots\dots\dots \text{cm}^2$

- (a) 22.5 (b) 90  
(c) 5 (d) 15



(27) If A is a point on the plane of circle M of diameter = 12 cm. and  $AM = 10$  cm.

, then  $P_M(A) = \dots\dots\dots$

- (a) 8 (b) - 8 (c) 64 (d) - 64

## Second Essay questions

Answer the following questions :

1 If L, M are the roots of the equation :  $x^2 - 2x + 5 = 0$ , find the equation whose roots are  $L + 3$ ,  $M + 3$

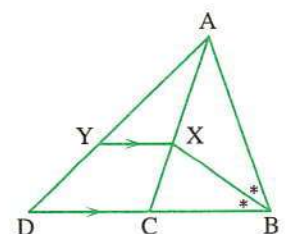
2 In the opposite figure :

$AB = AC$ ,  $BC = CD$

$\overrightarrow{BX}$  bisects  $\angle ABC$

,  $\overline{XY} \parallel \overline{BD}$

Prove that :  $\overrightarrow{CY}$  bisect  $\angle ACD$





**First Multiple choice questions**



Interactive tests 9

**Choose the correct answer from the given ones :**

(1) The solution set of the equation :  $X^2 + 9 = 0$  in the set of complex numbers is .....

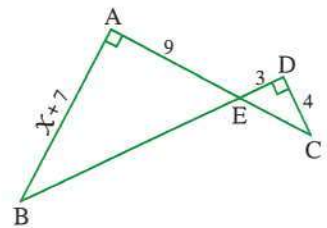
- (a)  $\{3i, -3i\}$  (b)  $\emptyset$  (c)  $\{3, -3\}$  (d)  $\{3i\}$

(2) If the roots of the equation  $mX^2 - 12X + 9 = 0$  are equal , then  $m =$  .....

- (a) 16 (b) 4 (c) 2 (d) 9

(3) In the opposite figure :

$\overline{BA} \perp \overline{AC}$  and  $\overline{CD} \perp \overline{DB}$   
 ,  $AB = X + 7$  ,  $AE = 9$  cm.  
 ,  $ED = 3$  cm. ,  $DC = 4$  cm.  
 , then  $X =$  ..... cm.



- (a) 9 (b) 3 (c) 4 (d) 5

(4) The simplest form of  $i^{42}$  is .....

- (a)  $-i$  (b)  $-1$  (c)  $i$  (d)  $1$

(5) If 2 and  $-3$  are the roots of the equation :  $2X^2 + bX + c = 0$  , then  $b - c =$  .....

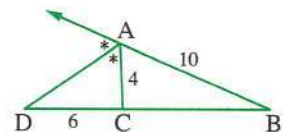
- (a) 10 (b)  $-14$  (c)  $-10$  (d) 14

(6) If one of the roots of the equation :  $X^2 - (k - 3)X + 5 = 0$  is the additive inverse of the other , then  $k =$  .....

- (a) 5 (b)  $-5$  (c) 3 (d)  $-3$

(7) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle BAC$  externally  
 , then  $BD =$  ..... cm.



- (a) 10 (b) 9  
 (c) 15 (d) 4

(8) The function  $f : f(X) = X^2 - X + 12$  is positive in the interval .....

- (a)  $\mathbb{R} - [-3, 4]$  (b)  $]-3, 4[$  (c)  $\mathbb{R} - \{3\}$  (d)  $]-\infty, \infty[$

(9) If the polygon ABCD is similar to the polygon XYZL and  $XY = 3AB$  , if the perimeter of ABCD is 20 cm. , then the perimeter of XYZL = ..... cm.

- (a) 30 (b) 60 (c) 90 (d) 120

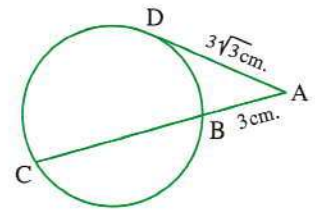
**(10) In the opposite figure :**

$\overline{AD}$  is a tangent of length  $3\sqrt{3}$  cm.

,  $AB = 3$  cm.

, then  $BC = \dots\dots\dots$  cm.

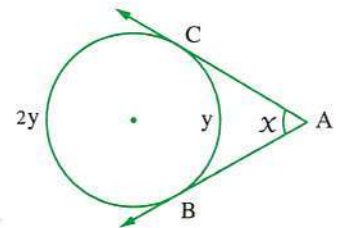
- (a) 9 (b) 7  
(c) 6 (d) 2



**(11) In the opposite figure :**

$\cos (y - x) = \dots\dots\dots$

- (a)  $\frac{\sqrt{3}}{2}$  (b)  $-\frac{\sqrt{3}}{2}$   
(c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$



**(12) The terminal side of an angle  $\theta$  in standard position intersects the unit circle**

at point B  $(x, \frac{3}{5})$  where  $x < 0$  , then  $\sin (90^\circ + \theta) = \dots\dots\dots$

- (a) -0.8 (b) -0.6 (c) 0.8 (d) 0.6

**(13) The simplest form of the expression :  $\tan (90^\circ + \theta) + \tan (90^\circ - \theta)$  is  $\dots\dots\dots$**

- (a)  $2 \cot \theta$  (b)  $2 \tan \theta$  (c) zero (d)  $\tan \theta + \cot \theta$

**(14) The measure of the central angle which opposite to an arc of length  $\pi$  cm.**

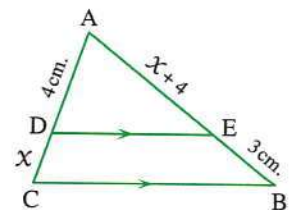
in a circle whose radius length 4 cm. =  $\dots\dots\dots$

- (a)  $\frac{\pi}{4}$  (b)  $\frac{\pi}{3}$  (c)  $\frac{2\pi}{3}$  (d)  $\frac{\pi}{8}$

**(15) In the opposite figure :**

$\overline{DE} \parallel \overline{BC}$  , then  $x = \dots\dots\dots$

- (a) 3 (b) 4  
(c) 2 (d) 6



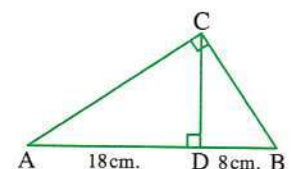
**(16) If  $\sin (2x) = \cos (4x)$  , where  $x$  is an acute angle , then  $\tan (90^\circ - 3x) = \dots\dots\dots$**

- (a) -0.5 (b) 0.5 (c) 1 (d) -1

**(17) In the opposite figure :**

$CD = \dots\dots\dots$  cm.

- (a)  $3\sqrt{13}$  (b)  $6\sqrt{13}$   
(c)  $4\sqrt{13}$  (d) 12



**(18) The function  $f : f(x) = x^2 - 5x + 6$  has two different signs in interval  $\dots\dots\dots$**

- (a)  $[2, 3]$  (b)  $[0, 2]$  (c)  $[3, 5\frac{1}{2}]$  (d)  $[1, 2\frac{1}{2}]$

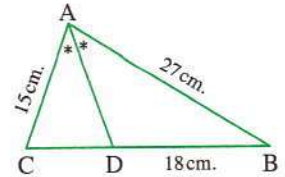
(19) The solution set of the inequality :  $x^2 - 5x - 6 \leq 0$  in  $\mathbb{R}$  is .....

- (a)  $[-1, 6]$  (b)  $] -1, 6[$  (c)  $\mathbb{R} - [-1, 6]$  (d)  $\mathbb{R} - ] -1, 6[$

(20) In the opposite figure :

AD = ..... cm.

- (a) 27 (b) 18  
(c) 15 (d) 20



(21) The angle of measure  $\frac{5}{6} \pi$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

(22) The range of the function  $f : f(x) = 5 \sin(3x)^\circ$  is .....

- (a)  $[-5, 5]$  (b)  $[-3, 3]$  (c)  $[1, 3]$  (d)  $[3, 5]$

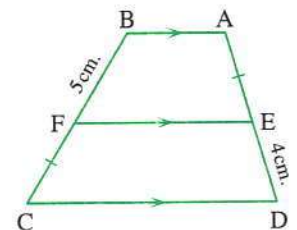
(23) If M is a circle of radius length 3 cm. , A is a point on its plane where MA = 5 cm.  
 , then  $P_M(A) = \dots\dots\dots$

- (a) -25 (b) -16 (c) 25 (d) 16

(24) In the opposite figure :

$\overline{AB} \parallel \overline{EF} \parallel \overline{DC}$  , AE = FC , BF = 5 cm.  
and ED = 4 cm. , then AE = ..... cm.

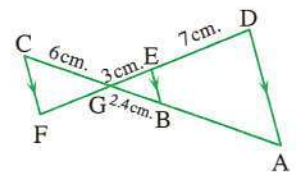
- (a) 2 (b)  $2\sqrt{5}$   
(c)  $5\sqrt{2}$  (d) 20



(25) In the opposite figure :

$\overline{AD} \parallel \overline{BE} \parallel \overline{CF}$  ,  $\overline{AC} \cap \overline{DF} = \{G\}$   
EG = 3 cm. , CG = 6 cm. , BG = 2.4 cm.  
and ED = 7 cm. , then GF = ..... cm.

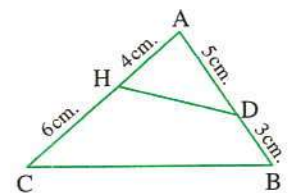
- (a) 7.5 (b) 8.5 (c) 9 (d) 10



(26) In the opposite figure :

AD = 5 cm. , BD = 3 cm. , AH = 4 cm. , HC = 6 cm.  
 , the area of the triangle AHD =  $16 \text{ cm}^2$   
 , then the area of the figure DBCH = .....  $\text{cm}^2$

- (a) 64 (b) 48 (c) 36 (d) 24



(27) In the opposite figure :

$\triangle AED \sim \triangle ACB$  ,  $ED = 3$  cm.

,  $BC = 5$  cm.

,  $AE = 4.5$  cm.

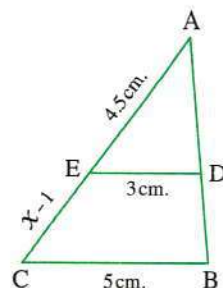
, then find the value of  $X$  .....

(a) 3.5

(b) 4

(c) 8.5

(d) 4.5



## Second Essay questions

Answer the following questions :

1 If  $\frac{3}{L}$  and  $\frac{3}{M}$  are the two roots of the equation :  $X^2 - 6X + 9 = 0$

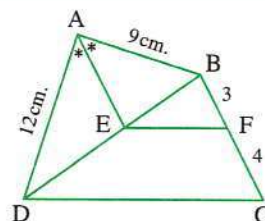
, then find the equation whose roots are L and M

2 In the opposite figure :

$AB = 9$  cm. ,  $AD = 12$  cm.

,  $\overrightarrow{AE}$  bisects  $\angle BAD$  and  $BF : FC = 3 : 4$

Prove that :  $\overline{FE} \parallel \overline{CD}$



10

El-Dakahlia Governorate



Maths Supervision

## First Multiple choice questions

Choose the correct answer from the given ones :

(1) The simplest form of the imaginary number  $i^{45}$  is .....

(a) i

(b) - 1

(c) - i

(d) 1

(2) The discriminant of the quadratic equation  $2X^2 + 5X + 4k = 0$  equal to zero

, then the value of k = .....

(a)  $\pm 14$

(b) zero

(c)  $\pm \frac{25}{32}$

(d)  $\frac{25}{32}$

(3) In the quadratic equation  $aX^2 - bX + c = 0$  , if the sum of the roots equal the product of them , then b = .....

(a) - a

(b) a

(c) - c

(d) c

(4) The quadratic equation whose roots are 3 , - 5 is .....

(a)  $X^2 + 2X - 15 = 0$

(b)  $X^2 - 2X + 15 = 0$

(c)  $X^2 - 2X - 15 = 0$

(d)  $X^2 + 2X + 15 = 0$



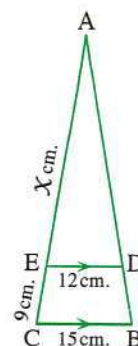
Interactive tests 10

- (5) The sign of the function  $f : f(x) = 6 - 2x$  is non-positive at .....
- (a)  $x > 3$  (b)  $x \leq 3$  (c)  $x < 3$  (d)  $x \geq 3$
- (6) The solution set of the inequality :  $x^2 + 49 < 0$  in  $\mathbb{R}$  is .....
- (a)  $\emptyset$  (b)  $\mathbb{R}$  (c)  $[-7, 7]$  (d)  $\mathbb{R} - [-7, 7]$
- (7) All function defined by the following rules are positive on  $\mathbb{R}$  except .....
- (a)  $f(x) = 3$  (b)  $f(x) = x + 3$   
 (c)  $f(x) = x^2 - 3x + 3$  (d)  $f(x) = x^2 + x + 3$
- (8)  $L, M$  are two roots of the equation  $x^2 - 7x + 3 = 0$ , then the equation whose two roots  $(L + M), (LM)$  is .....
- (a)  $x^2 - 10x + 21 = 0$  (b)  $x^2 - 21x + 10 = 0$   
 (c)  $x^2 + 10x + 21 = 0$  (d)  $x^2 - 21x - 10 = 0$
- (9) If  $\theta$  is the smallest positive measure of a directed angle, then its negative measure is .....
- (a)  $-\theta$  (b)  $\theta - 180$  (c)  $\theta - 360^\circ$  (d)  $360^\circ$
- (10) The angle of measure  $\frac{31\pi}{6}$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (11) If  $\cos \theta > 0$ ,  $\sin \theta = -\frac{\sqrt{3}}{2}$ , then a directed angle  $\theta$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (12) If  $\sin(2\theta) = \cos(4\theta)$ , where  $\theta$  is a positive acute angle, then  $\tan(90^\circ - 3\theta) = \dots\dots\dots$
- (a)  $-1$  (b)  $\frac{1}{\sqrt{3}}$  (c)  $1$  (d)  $\sqrt{3}$
- (13) The range of the function  $f : f(x) = \frac{\cos x}{5}$  where  $x \in \mathbb{R}$  is .....
- (a)  $[-\frac{1}{5}, \frac{1}{5}]$  (b)  $[-1, 1]$  (c)  $[-5, 5]$  (d)  $[0, \frac{2}{5}]$
- (14) If the terminal side of a directed angle  $\theta$  in the standard position intersect the unit circle at  $(-\frac{\sqrt{3}}{2}, y)$  where  $y \in \mathbb{Z}^+$ , then  $\theta = \dots\dots\dots^\circ$
- (a) 30 (b) 150 (c) 210 (d) 330
- (15) If  $\triangle ABC \sim \triangle DEF$ ,  $BC = 3EF$ , then the scale factor of similarity of two triangles = .....
- (a)  $\frac{2}{3}$  (b)  $\frac{1}{2}$  (c) 1 (d) 3

(16) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a) 12 (b) 24  
(c) 36 (d) 48



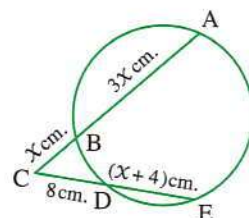
(17) If  $\triangle ABC \sim \triangle DEF$ ,  $a(\triangle ABC) = 9 a(\triangle DEF)$  and  $DE = 4$  cm. , then  $AB = \dots\dots\dots$  cm.

- (a)  $\frac{4}{3}$  (b) 12 (c) 9 (d) 36

(18) In the opposite figure :

$x = \dots\dots\dots$  cm.

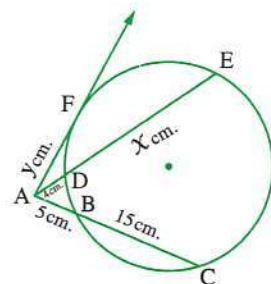
- (a) 3 (b) 5  
(c) 6 (d) 9



(19) In the opposite figure :

$x + y = \dots\dots\dots$  cm.

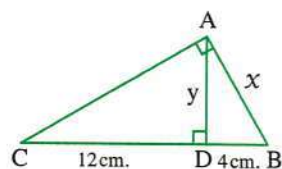
- (a) 9 (b) 18  
(c) 22 (d) 31



(20) In the opposite figure :

$(x, y) = \dots\dots\dots$

- (a)  $(4\sqrt{3}, 8)$  (b)  $(8, 4\sqrt{3})$   
(c)  $(4\sqrt{3}, 4\sqrt{3})$  (d)  $(8, 8)$



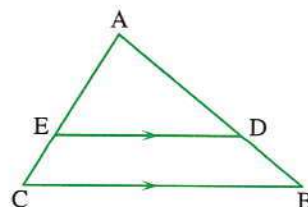
(21) Two similar polygons , the ratio between their perimeters equal  $4 : 9$  , then the ratio between the lengths of two corresponding sides is .....

- (a)  $4 : 9$  (b)  $2 : 3$  (c)  $16 : 81$  (d)  $9 : 4$

(22) In the opposite figure :

All the following statments must be true except .....

- (a)  $\frac{AD}{BD} = \frac{AE}{EC}$  (b)  $\frac{AD}{BA} = \frac{DE}{BC}$   
(c)  $\frac{AD}{BD} = \frac{AE}{AC}$  (d)  $\frac{AB}{BD} = \frac{AC}{EC}$



(23) In the opposite figure :

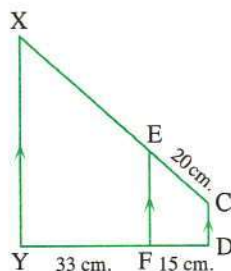
$\overline{CD} \parallel \overline{EF} \parallel \overline{XY}$  ,  $CE = 20$  cm.

,  $DF = 15$  cm. ,  $FY = 33$  cm.

, then  $CX = \dots\dots\dots$  cm.

(a) 48 (b) 64

(c) 44 (d) 21

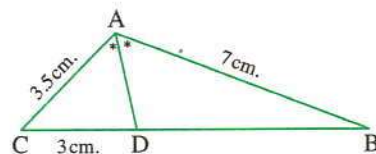


(24) In the opposite figure :

$BD = \dots\dots\dots$  cm.

(a) 4.5 (b) 5

(c) 4.9 (d) 6

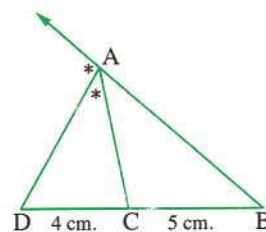


(25) In the opposite figure :

$AB : AC = \dots\dots\dots$

(a) 5 : 4 (b) 5 : 9

(c) 9 : 5 (d) 9 : 4

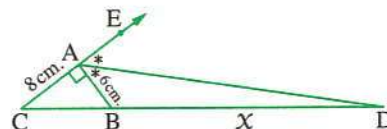


(26) In the opposite figure :

$X = \dots\dots\dots$  cm.

(a) 7.5 (b) 10

(c) 30 (d) 40



(27) If  $P_M(A) = r$  , where  $r$  is radius of the circle , then the point A lies .....

(a) outside the circle.

(b) inside the circle.

(c) on the circle.

(d) on the center of the circle.

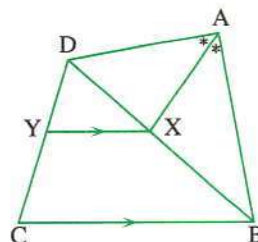
## Second Essay questions

Answer the following questions :

1 Find in  $\mathbb{R}$  the solution set of the inequality :  $x^2 - 3x - 4 \leq 0$

2 In the opposite figure :

Prove that :  $\frac{DY}{YC} = \frac{AD}{AB}$



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Damietta Governorate



Damietta Educational Directorate

**First Multiple choice questions**

Choose the correct answer from the given ones :

(1) The two similar polygons are congruent if the scale factor  $k$  satisfies .....

- (a)  $k = 0.5$  (b)  $k = 1$  (c)  $k > 1$  (d)  $0 < k < 1$

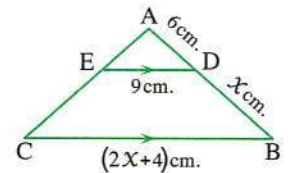
(2) In the opposite figure :

If  $\overline{DE} \parallel \overline{BC}$ ,  $ED = 9$  cm.

and  $AD = 6$  cm.

, then  $X = \dots\dots\dots$  cm.

- (a) 10 (b) 30 (c) 3 (d) 24



(3)  $\sqrt{-2} \times \sqrt{-8} = \dots\dots\dots$

- (a) 4 (b)  $-4$  (c)  $4i$  (d)  $-4i$

(4) The ratio between two corresponding sides of two similar squares is  $3 : 4$ , if the area of the greater square is  $48 \text{ cm}^2$ , then the area of the smaller one = .....  $\text{cm}^2$

- (a) 16 (b) 12 (c) 20 (d) 27

(5) All the following are measures of angles lying in the second quadrant except ..... $^\circ$

- (a)  $-240$  (b) 100 (c)  $-120$  (d) 860

(6) If the curve of the quadratic equation  $f : f(x) = x^2 - 2(m-2)x + m^2 - 8$  touches the  $x$ -axis, then  $m = \dots\dots\dots$

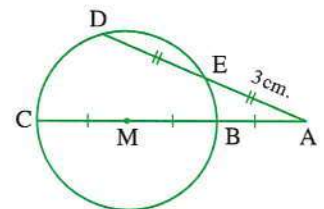
- (a) 2 (b) 3 (c) 4 (d) 5

(7) In the opposite figure :

If circle M in which,  $AE = 3$  cm.

, then  $CM = \dots\dots\dots$  cm.

- (a)  $\sqrt{3}$  (b) 9  
(c)  $2\sqrt{6}$  (d)  $\sqrt{6}$

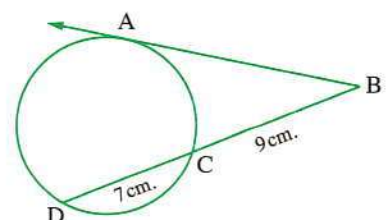


(8) In the opposite figure :

$\overrightarrow{BA}$  is a tangent,  $BC = 9$  cm.,  $CD = 7$  cm.

, then  $AB = \dots\dots\dots$  cm.

- (a)  $\frac{9}{16}$  (b) 12  
(c) 144 (d) 63



(9) If  $M, \frac{2}{M}$  are the roots of the equation :  $aX^2 + bX + 12 = 0$  , then  $a = \dots\dots\dots$

- (a) 9 (b) 6 (c) 5 (d) 3

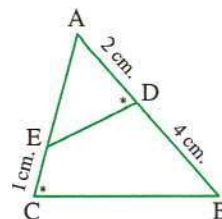
(10) In the opposite figure :

If  $m(\angle ADE) = m(\angle C)$

,  $AD = 2$  cm. ,  $DB = 4$  cm.

and  $EC = 1$  cm.

, then  $AE = \dots\dots\dots$  cm.

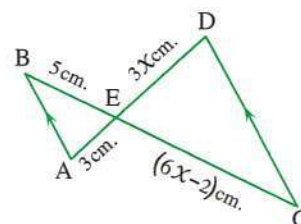


- (a) 5 (b) 4.5 (c) 3 (d) 4

(11) In the opposite figure :

If  $\overline{AB} \parallel \overline{CD}$  , then  $X = \dots\dots\dots$

- (a) 6 (b) 4.5  
(c) 3 (d) 2



(12) The circle of diameter length 12 cm. , the length of the arc subtended by a central angle of measure  $60^\circ$  equals  $\dots\dots\dots$  cm.

- (a)  $5\pi$  (b)  $4\pi$  (c)  $3\pi$  (d)  $2\pi$

(13) If one of the two roots of the equation :  $(k-3)X^2 - 5X + 2k = 8$  is the multiplicative inverse of the other root , then the value of  $k = \dots\dots\dots$

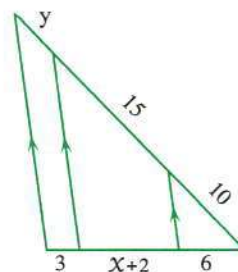
- (a) -3 (b) -5 (c) 3 (d) 5

(14) In the opposite figure :

If the given lengths in cm.

, then  $X + y = \dots\dots\dots$  cm.

- (a) 5 (b) 7  
(c) 11 (d) 12



(15) The range of the function  $f : f(\theta) = 3 \cos 2\theta$  equal  $\dots\dots\dots$

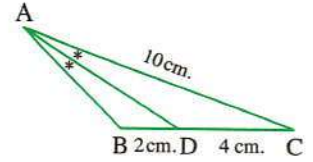
- (a)  $[-2, 2]$  (b)  $[-3, 3]$  (c)  $]-3, 3[$  (d)  $]-2, 2[$

(16) If the terminal side of the angle whose measure  $\theta$  drawn in the standard position intersect the unit circle at  $(-\frac{3}{5}, \frac{4}{5})$  , then  $\cot \theta = \dots\dots\dots$

- (a)  $\frac{5}{4}$  (b)  $-\frac{5}{3}$  (c)  $-\frac{4}{3}$  (d) -0.75

**(17) In the opposite figure :**

If  $\overrightarrow{AD}$  is the interior bisector of  $\angle BAC$   
 ,  $AC = 10$  cm. ,  $DC = 4$  cm. ,  $DB = 2$  cm.  
 , then the length of  $\overline{AD} = \dots\dots\dots$  cm.



- (a) 9 (b) 5 (c)  $\sqrt{42}$  (d)  $\sqrt{58}$

**(18) The exterior bisector at the vertex of an isosceles triangle ..... to the base.**

- (a) parallel (b) perpendicular (c) bisects (d) equal

**(19) The solution set of the inequality :  $(X - 2)(X + 4) \leq 0$  in  $\mathbb{R}$  is .....**

- (a)  $\mathbb{R} - [-4, 2]$  (b)  $\mathbb{R} - ]-4, 2[$  (c)  $] -4, 2[$  (d)  $[-4, 2]$

**(20)  $\cos(90^\circ - \theta) \times \csc \theta = \dots\dots\dots$**

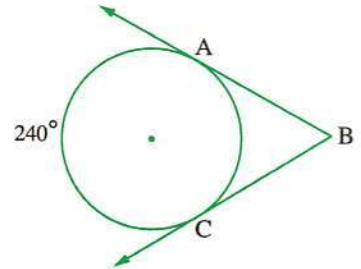
- (a) zero (b) 1 (c) -1 (d)  $-\frac{4}{5}$

**(21) If M is a circle of radius length 3 cm. , A is a point lies in its plane where  $MA = 4$  cm.  
 , then  $P_M(A) = \dots\dots\dots$**

- (a)  $\sqrt{7}$  (b) 9 (c) 7 (d) -7

**(22) In the opposite figure :**

If  $\overrightarrow{BA}$  ,  $\overrightarrow{BC}$  are two tangents and  $m(\widehat{AC}) = 240^\circ$   
 , then  $m(\angle B) = \dots\dots\dots^\circ$



- (a) 40 (b) 60  
 (c) 80 (d) 120

**(23)  $(3 + i)^2 = 6i + \dots\dots\dots$**

- (a) 4 (b) 6 (c) 8 (d) 10

**(24) The sign of the function  $f : f(X) = 6 - 2X$  is non positive at .....**

- (a)  $X > 3$  (b)  $X \leq 3$  (c)  $X < 3$  (d)  $X \geq 3$

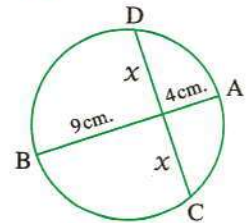
**(25) If  $\sin \theta = \frac{-1}{2}$  where  $\theta$  is measure of the smallest positive angle , then  $\theta = \dots\dots\dots^\circ$**

- (a) -30 (b) 30 (c) 210 (d) 150

**(26) In the opposite figure :**

$X = \dots\dots\dots$

- (a) -6 (b) -18  
 (c) 18 (d) 6



**(27) If  $(1 + i^4)(1 - i^7) = X + yi$  , then  $X + y = \dots\dots\dots$**

- (a) 4 (b) 3 (c) 2 (d) 1

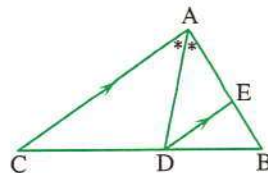
## Second Essay questions

Answer the following questions :

1 In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle BAC$  and  $\overline{AC} \parallel \overline{ED}$

Prove that :  $\frac{BE}{EA} = \frac{BA}{AC}$



2 If  $L, M$  are the two roots of the equation :  $x^2 - 5x + 9 = 0$   
 , find the equation whose roots  $L^2, M^2$

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El-Beheira Governorate



El-Tahrir Educational Directorate

## First Multiple choice questions

Choose the correct answer from the given ones :

(1) The conjugate of  $2i + 5$  is = .....

(a)  $2i - 5$

(b)  $-2i - 5$

(c)  $-2i + 5$

(d)  $2i + 5$

(2)  $\sqrt{-2} \times \sqrt{-32} = \dots\dots\dots$

(a) 8

(b)  $8i$

(c) -8

(d)  $8i$

(3) If the curve of the quadratic function  $f(x)$  does not intersect the  $x$ -axis , then the discriminant of the equation  $f(x)$  is .....

(a)  $> 0$

(b)  $< 0$

(c)  $= 0$

(d)  $\geq 0$

(4) The sum of the two roots of the equation  $bx^2 + cx + a = 0$  equals .....

(a)  $-\frac{b}{a}$

(b)  $-\frac{c}{a}$

(c)  $-\frac{c}{b}$

(d)  $\frac{a}{b}$

(5) If  $3i$  is one root of the equation  $x^2 + bx + c = 0$  where  $b, c \in \mathbb{R}$  , then  $b + c = \dots\dots\dots$

(a) 9

(b)  $9 + 6i$

(c)  $9 - 6i$

(d) -9

(6) The quadratic equation whose two roots are 2 and 5 is .....

(a)  $x^2 + 7x - 10 = 0$

(b)  $x^2 - 7x + 10 = 0$

(c)  $x^2 + 7x + 10 = 0$

(d)  $x^2 - 7x - 10 = 0$

(7) If  $f(x) = (x - 3)^2$  , then  $f(2) \times f(5) \in \dots\dots\dots$

(a)  $\mathbb{R}^-$

(b)  $\mathbb{R}^+$

(c)  $\{2, 5\}$

(d)  $\{-1, 2\}$

(8) The solution set of inequality  $x^2 + a \leq 0$  is ..... where  $a \in \mathbb{R}^+$

(a)  $\mathbb{R}$

(b)  $\emptyset$

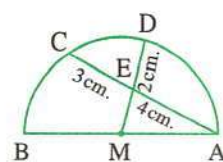
(c)  $\mathbb{R}^+$

(d)  $\mathbb{R}^-$

**(9) In the opposite figure :**

ME = ..... cm.

- (a) 2 (b) 6  
(c) 10 (d) 12



**(10)** The arc which its length  $4\pi$  cm. in a circle its radius length 12 cm. , opposite to central angle of measure .....

- (a)  $\frac{1}{2}\pi$  (b)  $\frac{1}{3}\pi$  (c)  $\frac{1}{4}\pi$  (d)  $\frac{1}{6}\pi$

**(11)** If  $\theta$  is the measure of angle lies in the third quadratic , then  $\sin \theta \times \sec \theta$  ..... 0

- (a) = (b) < (c) > (d)  $\leq$

**(12)** ABC is right angled triangle at B ,  $\sin A = \frac{3}{5}$  , then  $\sin (B + C) =$  .....

- (a)  $\frac{3}{5}$  (b)  $-\frac{3}{5}$  (c)  $\frac{4}{5}$  (d)  $-\frac{4}{5}$

**(13)** The maximum value of the function  $f : f(x) = 2 \sin 4x$  is .....

- (a) 2 (b) 4 (c) 6 (d) 8

**(14)** If  $\sec \theta = 2$  ,  $\theta \in ]270^\circ, 360^\circ[$  , then  $\theta =$  .....

- (a)  $60^\circ$  (b)  $120^\circ$  (c)  $240^\circ$  (d)  $300^\circ$

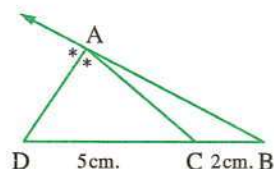
**(15)** If  $\Delta ABC \sim \Delta XYZ$  ,  $5AB = 3XY$  and the area of  $\Delta ABC = 18 \text{ cm}^2$  , then the area of  $\Delta XYZ =$  .....  $\text{cm}^2$

- (a) 10 (b) 30 (c) 25 (d) 50

**(16) In the opposite figure :**

AB : AC = .....

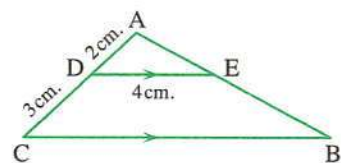
- (a) 2 : 5 (b) 7 : 5  
(c) 2 : 7 (d) 3 : 5



**(17) In the opposite figure :**

BC = ..... cm.

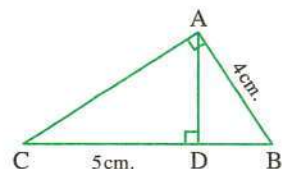
- (a) 6 (b) 8  
(c) 10 (d) 12



**(18) In the opposite figure :**

AC  $\times$  AD = .....

- (a) 16 (b) 20  
(c) 25 (d) 32



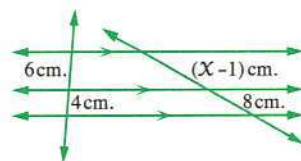
- (19) If the ratio between the areas of two squares 4 : 9 , then the ratio between their primeters = .....

(a) 16 : 36 (b) 2 : 3 (c) 16 : 81 (d) 4 : 9

- (20) In the opposite figure :

$X = \dots\dots\dots$

(a) 11 (b) 4  
(c) 12 (d) 13



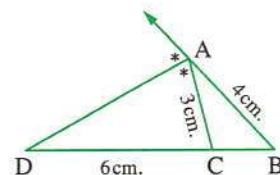
- (21) If  $P_M(A) = 7$  , then A lies ..... the circle.

(a) outside (b) inside (c) on (d) at the center of

- (22) In the opposite figure :

BC = .....

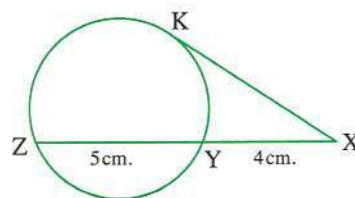
(a) 5 (b) 2  
(c) 8 (d) 10



- (23) In the opposite figure :

XK = .....

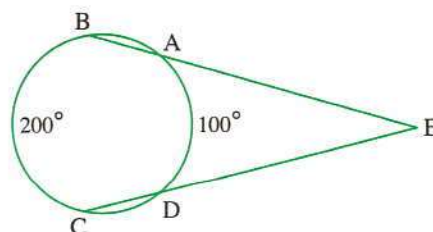
(a) 9 (b) 20  
(c) 6 (d) 36



- (24) In the opposite figure :

$m(\angle E) = \dots\dots\dots^\circ$

(a) 50 (b) 75  
(c) 100 (d) 150



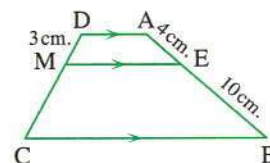
- (25) The triangle which has two angles with measure  $30^\circ$  and  $70^\circ$  similar to the triangle which has two angles with measure  $70^\circ$  and ..... $^\circ$

(a) 80 (b) 100 (c) 60 (d) 40

- (26) In the opposite figure :

MC = ..... cm.

(a) 15 (b) 11  
(c) 9 (d) 7.5



- (27) The angle its measure is  $-15^\circ$  lies in the ..... quadrant.

(a) first (b) second (c) third (d) fourth

## Second Essay questions

Answer the following questions :

- 1 If  $L + 2$  and  $M + 2$  is the two roots of the quadratic equation  $X^2 - 11X + 3 = 0$  form the equation whose roots are  $L$  and  $M$
- 2 ABC is a right angled triangle at B , which  $AB = 12$  cm. ,  $AC = 20$  cm.  
If  $\overrightarrow{AD}$  bisect  $(\angle BAC)$  and intersect  $\overline{BC}$  in D , find the length of  $\overline{CD}$

13 Beni Suef Governorate



Education Administration

## First Multiple choice questions

Choose the correct answer from the given ones :

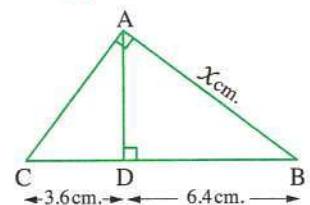
- (1) The quadratic equation whose roots are  $(1 + i)$  and  $(1 - i)$  is .....  
 (a)  $X^2 + 2X + 2 = 0$  (b)  $X^2 - 2X + 2 = 0$   
 (c)  $X^2 + 2X - 2 = 0$  (d)  $X^2 - 2X - 2 = 0$
- (2) The simplest form of  $(1 - i)^2$  of the expression is .....  
 (a)  $-2$  (b)  $-2i$  (c)  $2$  (d)  $2i$
- (3) The sign of the function :  $f(X) = 6 - 3X$  has a positive sign if .....  
 (a)  $X \geq 2$  (b)  $X > 2$  (c)  $X < 2$  (d)  $X = 2$
- (4) The solution set of the equation :  $X^2 + 9 = 0$  in  $\mathbb{R}$  is .....  
 (a)  $\{\pm 3\}$  (b)  $\{\pm 3i\}$  (c)  $\{9\}$  (d)  $\emptyset$
- (5) If  $X = 2$  is one of the two roots of the equation  $X^2 + 2X + k = 0$  , then  $k =$  .....  
 (a)  $-8$  (b)  $0$  (c)  $2$  (d)  $8$
- (6) If the two roots of the equation  $mX^2 - 12X + 9 = 0$  are complex numbers , then .....  
 (a)  $m > 4$  (b)  $m = 4$  (c)  $m < 4$  (d)  $m = 1$
- (7) If  $(2X - 1) + 5i = 3 + (y + 4)i$  , then  $X + y =$  .....  
 (a)  $3$  (b)  $2$  (c)  $1$  (d)  $0$
- (8) If  $L$  and  $M$  are the two roots of the equation :  $X^2 + 3X - 4 = 0$  , then  $L + M =$  .....  
 (a)  $-4$  (b)  $-3$  (c)  $3$  (d)  $4$
- (9) The radian measure of a central angle which subtended an arc of length 3 cm. of a circle whose diameter length equal 4 cm. is .....  
 (a)  $\left(\frac{3}{4}\right)^{\text{rad}}$  (b)  $\left(\frac{3}{2}\right)^{\text{rad}}$  (c)  $6^{\text{rad}}$  (d)  $\left(\frac{2}{3}\right)^{\text{rad}}$

- (10) If  $X$  and  $y$  are two acute angles where  $\tan X = \cot y$ , then  $\cos (X + y) = \dots\dots\dots$   
 (a)  $-1$  (b) zero (c)  $1$  (d) undefined
- (11) If  $f(X) = 3 \cos 5X$ ,  $X \in \mathbb{R}$ , then the minimum value of the function  $f(X) = \dots\dots\dots$   
 (a)  $-5$  (b)  $-3$  (c)  $3$  (d)  $5$
- (12) All equilateral triangles are  $\dots\dots\dots$   
 (a) congruent. (b) similar.  
 (c) equal in area. (d) equal in perimeter.
- (13) If  $\sin A = -1$ ,  $\cos A = 0$ , then  $A = \dots\dots\dots^\circ$   
 (a)  $0$  (b)  $90$  (c)  $180$  (d)  $270$
- (14) If  $25 \cos \theta = 7$  where  $\theta \in \left] \frac{3\pi}{2}, 2\pi \right[$ , then  $\tan \theta = \dots\dots\dots$   
 (a)  $\frac{24}{7}$  (b)  $\frac{7}{24}$  (c)  $-\frac{24}{7}$  (d)  $-\frac{7}{24}$
- (15) If the ratio between the perimeters of two similar triangles is  $4 : 9$ , then the ratio between their two surface areas  $\dots\dots\dots$   
 (a)  $4 : 9$  (b)  $2 : 3$  (c)  $16 : 81$  (d)  $9 : 4$
- (16) A rectangle has dimensions  $4$  cm. ,  $2$  cm. , then the perimeter of another rectangle similar to it , if the scale factor of similarity equal  $3$  , is  $\dots\dots\dots$  cm.  
 (a)  $4$  (b)  $18$  (c)  $24$  (d)  $36$
- (17)  $\sin (180^\circ + A) \sec (270^\circ + A) = \dots\dots\dots$   
 (a)  $\tan A$  (b)  $\cot A$  (c)  $\cot 45^\circ$  (d)  $\tan 135^\circ$
- (18) If  $\Delta ABC \sim \Delta XYZ$  and  $AB = 3 XY$ , then  $\frac{\text{Area of } (\Delta ABC)}{\text{Area of } (\Delta XYZ)} = \dots\dots\dots$   
 (a)  $\frac{1}{9}$  (b)  $\frac{1}{3}$  (c)  $3$  (d)  $9$

(19) In the opposite figure :

$XC = \dots\dots\dots$  cm.

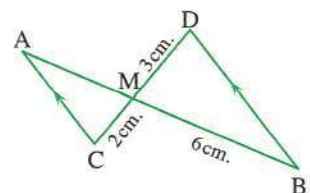
- (a)  $4.8$  (b)  $6$   
 (c)  $8$  (d)  $10$



(20) In the opposite figure :

$\overleftrightarrow{AC} \parallel \overleftrightarrow{BD}$ ,  $AM = \dots\dots\dots$  cm.

- (a)  $1$  (b)  $2$   
 (c)  $4$  (d)  $8$



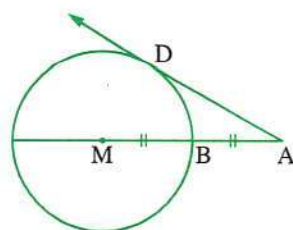
(21) If  $P_M(A) = 0$ , then A lies  $\dots\dots\dots$  the circle M

- (a) on (b) inside (c) outside (d) on the centre of

- (22) If  $\overleftrightarrow{AD}$  is a tangent to circle M,  $AB = BM$

$AD = 2\sqrt{3}$  cm. , then  $AB = \dots\dots\dots$

- (a) 2 (b) 4  
(c) 6 (d) 8



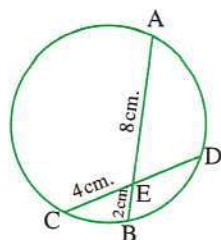
- (23) In the opposite figure :

$AE = 8$  cm. ,  $BE = 2$  cm.

and  $CE = 4$  cm.

, then  $DE = \dots\dots\dots$

- (a) 2 (b) 4  
(c) 6 (d) 8



- (24) Any two regular polygons having the same number of sides are  $\dots\dots\dots$

- (a) congruent. (b) similar.  
(c) equal in area. (d) equal in perimeter.

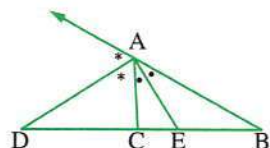
- (25) In the opposite figure :

$\overleftrightarrow{AD}$  bisects the exterior angle at A

$\overleftrightarrow{AE}$  bisects the interior angle at A

, then  $m(\angle EAD) = \dots\dots\dots^\circ$

- (a) 30 (b) 45 (c) 60 (d) 90



- (26) If  $\triangle LMN \sim \triangle XYZ$  and  $m(\angle L) = 35^\circ$  ,  $m(\angle Z) = 75^\circ$  so  $m(\angle M) = \dots\dots\dots^\circ$

- (a) 35 (b) 70 (c) 75 (d) 110

- (27) If the power of a point A with respect to the circle M of radius length 6 cm.

is equals 64 cm. , then  $AM = \dots\dots\dots$

- (a) 6 (b) 8 (c) 10 (d) 100

## Second Essay questions

Answer the following questions :

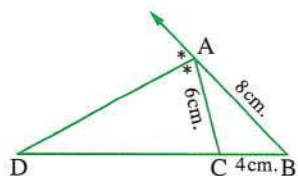
- 1 Determine the sign of the function :  $f(x) = x^2 + 2x - 15$  , then represent your answer on the number line.

- 2 In the opposite figure :

$\overleftrightarrow{AD}$  bisects the exterior angle at A

$AB = 8$  cm. ,  $CB = 4$  cm. and  $AC = 6$  cm.

Find the length of  $\overline{CD}$



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El-Menia Governorate



Bani Mazar Administration  
Math Department

### First Multiple choice questions

Choose the correct answer from the given ones :

(1) If  $X = 3$  is one of the roots of the equation  $X^2 - 7X + k = 0$ , then the value of  $k = \dots\dots\dots$

- (a) 3 (b) 4 (c) -12 (d) 12

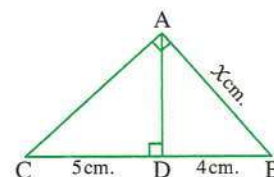
(2) Solution set of the equation  $X^2 + 25 = 0$  in complex numbers is  $\dots\dots\dots$

- (a)  $\{5\}$  (b)  $\{-5\}$  (c)  $\{-5i, 5i\}$  (d)  $\emptyset$

(3) In the opposite figure :

$X = \dots\dots\dots$  cm.

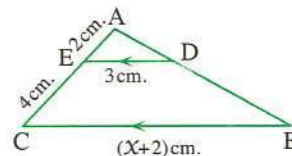
- (a) 20 (b) 12  
(c) 9 (d) 6



(4) In the opposite figure :

$X = \dots\dots\dots$  cm.

- (a) 7 (b) 6  
(c) 12 (d) 16



(5) The directed angle whose terminal side intersects the unit circle at  $(X, y)$  where  $X > 0$ ,  $y < 0$  lie in the  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

(6) Length of the arc of circle whose radius length 6 cm. and opposite central angle of measure  $30^\circ$  is equal to  $\dots\dots\dots$  cm.

- (a)  $6\pi$  (b)  $4\pi$  (c)  $2\pi$  (d)  $\pi$

(7) If  $(X + 1) + (y - 2)i = 4 + 3i$ , then  $X + y = \dots\dots\dots$

- (a) 8 (b) 5 (c) 7 (d) 3

(8) If the two roots of the equation  $X^2 - 8X + k = 0$  are equal real numbers, then the value of  $k = \dots\dots\dots$

- (a) 8 (b) 16 (c) -8 (d) -16

(9) In the opposite figure :

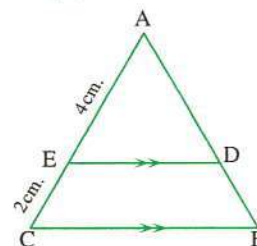
$\overline{DE} \parallel \overline{BC}$ ,  $AE = 4$  cm.

,  $EC = 2$  cm.

, the area of  $\triangle ADE = 12$  cm<sup>2</sup>

, then area of the trapezium DBCE is  $\dots\dots\dots$  cm<sup>2</sup>

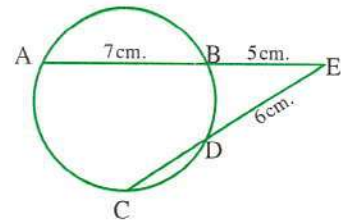
- (a) 6 (b) 15 (c) 18 (d) 27



**(10) In the opposite figure :**

$AB = 7 \text{ cm.}$  ,  $BE = 5 \text{ cm.}$  ,  $DE = 6 \text{ cm.}$   
 , the length of  $\overline{CD}$  is ..... cm.

- (a) 6 (b) 5  
 (c) 4 (d) 3



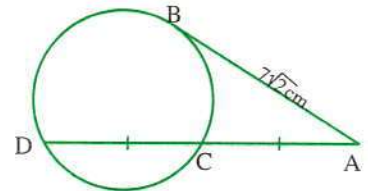
**(11)  $\sin (90 - \theta) \sec \theta =$  .....**

- (a) -1 (b) zero (c) 1 (d)  $\sqrt{3}$

**(12) In the opposite figure :**

$\overline{AB}$  is a tangent segment of a circle at B  
 , C is midpoint of  $\overline{AD}$  ,  $AB = 7\sqrt{2}$   
 , then the length of  $\overline{AD}$  is ..... cm.

- (a) 14 (b) 7 (c)  $7\sqrt{2}$  (d)  $14\sqrt{2}$



**(13) If one of the roots of the equation  $3X^2 + 10X + (m - 1) = 0$  is a multiplicative inverse of the other , then the value of  $m =$  .....**

- (a) 3 (b) 4 (c) -4 (d) 10

**(14) If L and M are two roots of the equation  $X^2 - 4X + 3 = 0$  , then  $L^2 + M^2 =$  .....**

- (a) 3 (b) 4 (c) -10 (d) 10

**(15) If  $2 \sin \theta - \sqrt{3} = 0$  , where  $\theta \in ]\frac{\pi}{2}, \pi[$  , then  $\theta =$  .....**

- (a)  $135^\circ$  (b)  $60^\circ$  (c)  $150^\circ$  (d)  $120^\circ$

**(16) The sign of the function  $f : f(X) = 8 - 2X$  is positive if .....**

- (a)  $X > 4$  (b)  $X \geq 4$  (c)  $X < 4$  (d)  $X \leq 4$

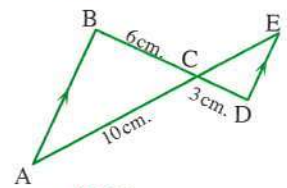
**(17) If the ratio between areas of two similar polygon is  $9 : 16$  , then the ratio between its perimeter is .....**

- (a)  $18 : 32$  (b)  $3 : 4$  (c)  $81 : 256$  (d)  $4 : 3$

**(18) In the opposite figure :**

$\overline{AB} \parallel \overline{DE}$  ,  $CD = 3 \text{ cm.}$  ,  $AC = 10 \text{ cm.}$  ,  $BC = 6 \text{ cm.}$   
 , then the length of  $\overline{CE}$  is ..... cm.

- (a) 5 (b) 8 (c) 12 (d) 18



**(19) If  $\sin (2\theta) = \cos (4\theta)$  , where  $\theta$  is an acute positive angle , then  $\tan (90 - 3\theta) =$  .....**

- (a) -1 (b) zero (c) 1 (d)  $\sqrt{2}$

(20) Solution set of an inequality  $X^2 - 5X \leq -6$  in  $\mathbb{R}$  is .....

- (a)  $\mathbb{R} - ]2, 3[$  (b)  $\mathbb{R} - [2, 3]$  (c)  $]2, 3[$  (d)  $[2, 3]$

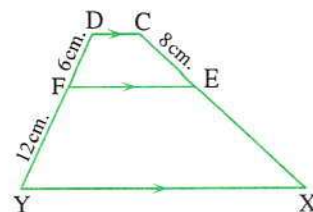
(21) In the opposite figure :

$\overline{CD} \parallel \overline{FE} \parallel \overline{XY}$ ,  $CE = 8$  cm.

,  $DF = 6$  cm. ,  $FY = 12$  cm.

, then the length of  $\overline{XE}$  is ..... cm.

- (a) 42 (b) 16 (c) 24 (d) 21



(22) If a function  $f : f(\theta) = 3 \sin 2\theta$  is periodic and its period is .....

- (a)  $\frac{\pi}{2}$  (b)  $\frac{\pi}{3}$  (c)  $2\pi$  (d)  $\pi$

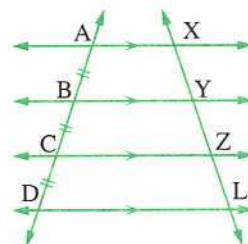
(23) In the opposite figure :

$\overrightarrow{AX} \parallel \overrightarrow{BY} \parallel \overrightarrow{CZ} \parallel \overrightarrow{DL}$ ,  $\overrightarrow{XL}$ ,  $\overrightarrow{BC}$  are two transversal

,  $AB = BC = CD$  if  $YL = 10$  cm.

, then  $XL =$  ..... cm.

- (a) 5 (b) 10  
(c) 15 (d) 30



(24) The two bisectors of the interior and exterior angle at any vertex of a triangle make an angle of measure .....

- (a)  $45^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $120^\circ$

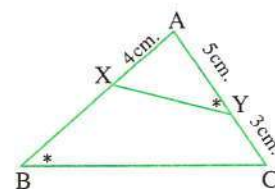
(25) In the opposite figure :

In  $\triangle ABC$  :  $m(\angle AYX) = m(\angle ABC)$

,  $AX = 4$  cm. ,  $AY = 5$  cm. ,  $YC = 3$  cm.

, then the length of  $\overline{XB}$  is ..... cm.

- (a) 10 (b) 6 (c) 5 (d) 3



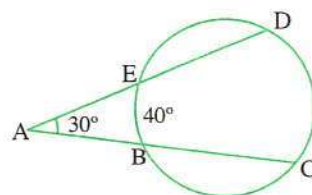
(26) A circle M whose radius length 5 cm. , if a point (A) in its plane ,  $MA = 7$  cm. , then  $P_M(A) =$  .....

- (a) 2 (b) 9 (c) 12 (d) 24

(27) In the opposite figure :

$m(\angle A) = 30^\circ$  ,  $m(\widehat{BE}) = 40^\circ$  , then  $m(\widehat{DC}) =$  ..... $^\circ$

- (a) 100 (b) 70  
(c) 40 (d) 30



## Second Essay questions

Answer the following questions :

- 1** If L and M are two roots of the equation  $X^2 - 3X + 5 = 0$   
 , then form the equation with the two roots  $\frac{1}{L}$  ,  $\frac{1}{M}$

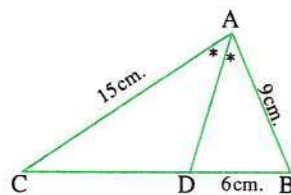
- 2** In the opposite figure :

In  $\triangle ABC$  :  $\overline{AD}$  bisects  $(\angle A)$

, AB = 9 cm. , AC = 15 cm. , BD = 6 cm.

Find the length of :

- (1)  $\overline{CD}$  (2)  $\overline{AD}$



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Qena Governorate



Mathematics Supervision

## First Multiple choice questions

Choose the correct answer from the given ones :

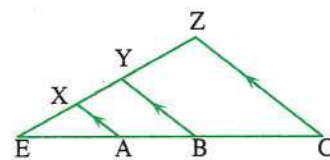
- (1)** If one of two roots of the equations  $(k - 2)X^2 + 3X + 6 = 0$  is multiplicative inverse of other , then k = .....
- (a) -2 (b) 2 (c) 8 (d) 6
- (2)** Two similar polygons the ratio between two corresponding sides is 1 : 3 , which of following is not correct ?
- (a) Ratio between their perimeter equal 1 : 9  
 (b) Ratio between their surface areas equal 1 : 9  
 (c) Ratio between their corresponding angles equal 1  
 (d) Similarity factor equal 1 : 3
- (3)** Function f where  $f(X) = 2$  is positive in the interval .....
- (a)  $[-2, 2]$  (b)  $]-\infty, 2[$  (c)  $]2, \infty[$  (d)  $]-\infty, \infty[$
- (4)** If the ratio between the surface areas of two similar triangle is 1 : 4 , then the ratio between their perimeters equal .....
- (a) 1 : 2 (b) 1 : 4 (c) 1 : 8 (d) 1 : 16
- (5)** If  $2X - 3Y + (3Y + 1)i = 7 + 10i$  , then XY = .....
- (a) 3 (b) 0 (c) 24 (d) 11

(6) In the opposite figure :

$\overline{AX} \parallel \overline{BY} \parallel \overline{CZ}$  ,  $EA = 6$  cm. ,  $EX = 4$  cm.

$XY = 3$  cm. ,  $BC = 7.5$  cm.

, then  $AB + ZY = \dots\dots\dots$  cm.



- (a) 4.5 (b) 9.5 (c) 5 (d) 9

(7) General solution of equation  $\tan (3 \theta + 10) = \cot (2 \theta + 15)$  is  $\dots\dots\dots$

- (a)  $\theta = 13^\circ + 90^\circ n$  (b)  $\theta = 13^\circ + 72^\circ n$   
(c)  $\theta = 13^\circ + 36^\circ n$  (d)  $\theta = 13^\circ - 90^\circ n$

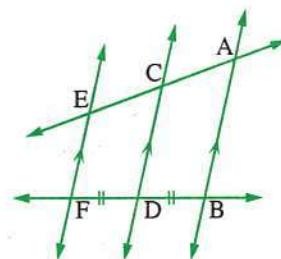
(8) In the opposite figure :

$\overline{AB} \parallel \overline{CD} \parallel \overline{EF}$  ,  $AC = (X - 3)$  cm.

,  $CE = (Y + 2)$  cm. ,  $BD = (X + 3)$  cm.

,  $DF = (2Y + 5)$  ,  $BD = DF$

, then  $X + Y = \dots\dots\dots$



- (a) 3 (b) 8 (c) 5 (d) 11

(9) If the two roots of the equations :  $X^2 - 6X + L = 0$  are two equal real numbers

, then  $L = \dots\dots\dots$

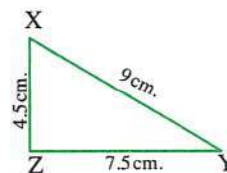
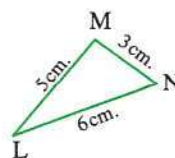
- (a) 9 (b) 8 (c) -9 (d) -8

(10) In the opposite figure :

If the two triangles are similar

, then the similarity factor =  $\dots\dots\dots$

- (a)  $\frac{3}{4}$  (b)  $\frac{3}{2}$  (c)  $\frac{9}{10}$  (d)  $\frac{9}{5}$



(11) If  $\cos \theta = -\frac{\sqrt{3}}{2}$  ,  $\sin \theta = \frac{1}{2}$  , then  $\theta = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $150^\circ$  (c)  $210^\circ$  (d)  $120^\circ$

(12)  $(2 + i)(2 - i) = \dots\dots\dots$

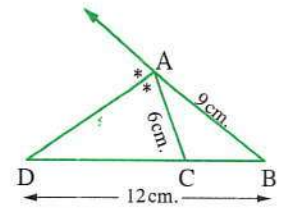
- (a) 4 (b) 3 (c) 5 (d)  $2i$

(13) The degree measure for the central angle in a circle , where its radius 6 cm. , opposite to an arc its length of  $3\pi$  cm. , equals  $\dots\dots\dots$

- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $120^\circ$  (d)  $90^\circ$

**(14) In the opposite figure :**

$\overrightarrow{AD}$  bisects exterior angle for  $\triangle ABC$  at vertex A  
 ,  $AC = 6$  cm. ,  $BD = 12$  cm. ,  $AB = 9$  cm.  
 , then  $BC = \dots\dots\dots$  cm.



- (a) 4 (b) 8 (c) 6 (d) 3

**(15)** If  $f : [-2, 4] \rightarrow \mathbb{R}$  where  $f(x) = 2 - x$ , then sign of  $f(x)$  is negative in the interval  $\dots\dots\dots$

- (a)  $]2, 4]$  (b)  $]2, 4[$  (c)  $[-2, 2]$  (d)  $[-2, 2[$

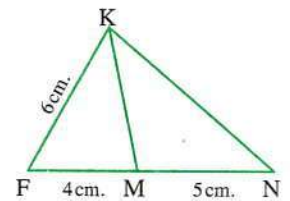
**(16)** Circle M, its radius  $r$ , if  $P_M(B) = \frac{1}{2}r$ , then point B, lies  $\dots\dots\dots$

- (a) inside circle. (b) outside circle.  
 (c) on circle. (d) on center circle.

**(17) In the opposite figure :**

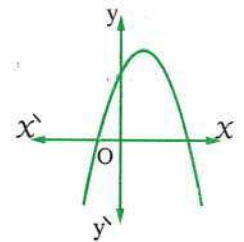
$\triangle FMK \sim \triangle \dots\dots\dots$

- (a) NKM (b) FNK  
 (c) MNK (d) FKN



**(18)** The opposite figure represents the curve  $y = ax^2 + bx + c$ , which of the following is correct ?

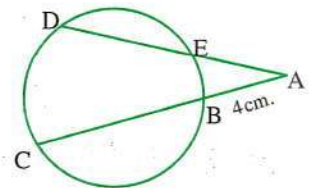
- (a)  $a > 0, c > 0$  (b)  $a > 0, c < 0$   
 (c)  $a < 0, c > 0$  (d)  $a < 0, c < 0$



**(19) In the opposite figure :**

If  $AE = 3$  cm. ,  $DE = 13$  cm. ,  $AB = 4$  cm.  
 , then  $BC = \dots\dots\dots$  cm.

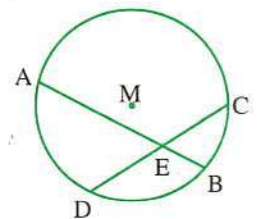
- (a) 12 (b) 8  
 (c) 16 (d) 14



**(20) In the opposite figure :**

$m(\widehat{AC}) = 165^\circ$  ,  $m(\angle CEA) = 120^\circ$   
 , then  $m(\widehat{BD}) = \dots\dots\dots$

- (a)  $100^\circ$  (b)  $142^\circ 30'$   
 (c)  $60^\circ$  (d)  $75^\circ$



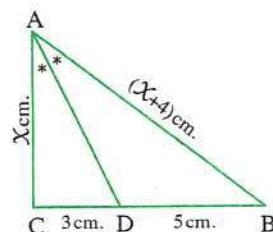
**(21)** Angle with measure  $(-850^\circ)$  lies in  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

(22) In the opposite figure :

$$x = \dots\dots\dots$$

- (a) 6 (b) 5  
(c) 4 (d) 3

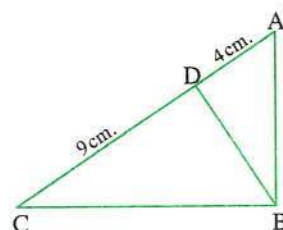


(23) In the opposite figure :

If  $AD = 4$  cm. ,  $CD = 9$  cm.

, then  $BD = \dots\dots\dots$

- (a) 4 (b) 5  
(c) 6 (d) 9



(24) If  $15 \tan A = -8$  ,  $90^\circ < A < 180^\circ$  , then the value of :

$$5 \sec (2 \pi - A) + 4 \cot (2 \pi - A) = \dots\dots\dots$$

- (a)  $-\frac{581}{255}$  (b)  $\frac{581}{255}$  (c)  $-\frac{6}{11}$  (d)  $\frac{11}{6}$

(25) Range of function  $f$  where  $f(\theta) = 3 \sin 2\theta$  is .....

- (a)  $[-3, 3[$  (b)  $[-3, 3]$  (c)  $] -3, 3]$  (d)  $] -3, 3[$

(26) Two similar rectangles , the first has length three times its width , if the second has length of 12 cm. , then its width = ..... cm.

- (a) 36 (b) 4 (c) 3 (d) 9

(27) If  $L$  and  $M$  are the two roots of the equation  $x^2 + 2x + 5 = 0$  , then the quadratic equation whose roots are  $L + 2$  ,  $M + 2$  is .....

- (a)  $2x^2 + 2x + 5 = 0$  (b)  $2x^2 + 2x - 5 = 0$   
(c)  $x^2 - 2x + 5 = 0$  (d)  $x^2 - 2x - 5 = 0$

## Second Essay questions

Answer the following questions :

1 Find in  $\mathbb{R}$  the solution set of following inequality :  $x^2 + 2x - 8 > 0$

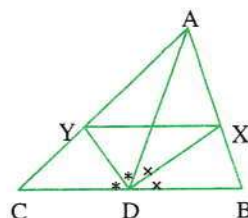
2 In the opposite figure :

If  $\overline{AD}$  median of  $\triangle ABC$

,  $\overrightarrow{DX}$  bisect  $\angle ADB$

,  $\overrightarrow{DY}$  bisect  $\angle ADC$

Prove that :  $\overline{XY} \parallel \overline{BC}$



حمل الآن

مجاناً وحصرياً

# امتحانات رقم (3)

## الترم الاول



1

Cairo Governorate

El-Sherouk Zone  
El-Golf Distinguished Governmental School**First Multiple choice questions**

Choose the correct answer from the given ones :

(1) If  $(1 + i^4)(1 - i^7) = x + yi$ , then  $x + y = \dots\dots\dots$ 

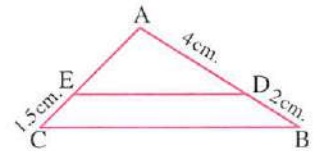
- (a) -2 (b) 2 (c) 4 (d) 6

(2) If  $\frac{2}{L}$  and  $\frac{2}{M}$  are the roots of :  $x^2 - 8x + 4 = 0$ , then  $LM = \dots\dots\dots$ 

- (a) -8 (b) -4 (c) 1 (d) 4

(3) If  $\triangle ADE \sim \triangle ABC$ ,  $AD = 4$  cm. ,  $AB = 6$  cm.and  $CE = 1.5$  cm. , then  $AE = \dots\dots\dots$  cm.

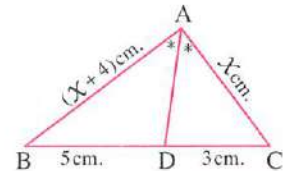
- (a) 3 (b) 5 (c) 6 (d) 7

(4) If  $L$  and  $L^2$  are the roots of :  $x^2 - bx + 8 = 0$ , then  $b = \dots\dots\dots$ 

- (a) 2 (b) 4 (c) 6 (d) 8

(5) In  $\triangle ABC$ ,  $\overline{AD}$  bisects  $\angle CAB$ ,  $AB = (x + 4)$  cm. ,  $AC = x$  cm.and  $CD = 3$  cm. ,  $DB = 5$  cm., then  $x = \dots\dots\dots$ 

- (a) 4 (b) 6 (c) 8 (d) 10

(6) If  $\overline{AB}$  is tangent to the circle  $M$  at the point  $B$  and  $P_M(A) = 25$  cm<sup>2</sup>, then  $AB = \dots\dots\dots$  cm.

- (a) 5 (b) 16 (c) 20 (d) 25

(7) The range of the function  $f : f(x) = 4 \sin 3x$  is  $\dots\dots\dots$ 

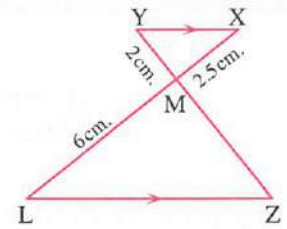
- (a)  $]-4, 4[$  (b)  $[-4, 4]$  (c)  $\mathbb{R} - ]-3, 4[$  (d)  $[-3, 3]$

(8) If  $L$  and  $M$  are the roots of the equation :  $x^2 + 3x + 3 = 0$ , then the equation whose roots are  $LM$  and  $L + M$  is  $\dots\dots\dots$ 

- (a)  $x^2 + 9 = 0$  (b)  $x^2 = 9$   
(c)  $x^2 - 3 = 0$  (d)  $x^2 + 9x = 0$

**(9) In the opposite figure :**

If  $\overline{LZ} \parallel \overline{YX}$ ,  $\overline{YZ} \cap \overline{XL} = \{M\}$ ,  $XM = 2.5$  cm. ,  $YM = 2$  cm. ,  $LM = 6$  cm. , then  $MZ = \dots\dots\dots$  cm.



- (a) 2.7 (b) 3.6  
(c) 4.8 (d) 7.5

**(10) The solution set of :  $4 - x^2 \geq 0$  is .....**

- (a)  $[-2, 2]$  (b)  $[4, \infty[$   
(c)  $\mathbb{R} - ]-2, 2[$  (d)  $\mathbb{R} - [-2, 2]$

**(11) The ratio between the lengths of two corresponding sides of two similar polygons is  $5 : 4$  and the difference between thier areas is  $27 \text{ cm}^2$  , then the area of the smaller polygon is .....  $\text{cm}^2$**

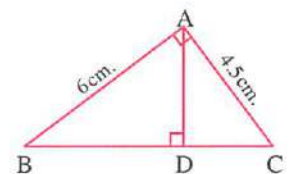
- (a) 3 (b) 9 (c) 16 (d) 48

**(12)  $\sin(180^\circ - \theta) \times \sec(270^\circ + \theta) = \dots\dots\dots$**

- (a)  $\tan \theta$  (b)  $\csc \theta$  (c) 1 (d) -1

**(13) In the opposite figure :**

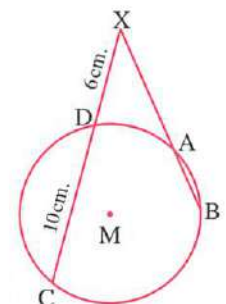
$\Delta ABC$  in which  $m(\angle A) = 90^\circ$  ,  $\overline{AD} \perp \overline{BC}$  ,  $AB = 6$  cm. and  $AC = 4.5$  cm. , then  $AD = \dots\dots\dots$  cm.



- (a) 2.7 (b) 3.6 (c) 4.8 (d) 7.5

**(14) In the opposite figure :**

M is a circle where  $\overrightarrow{BA} \cap \overrightarrow{CD} = \{X\}$  , if  $XA = 2 AB$  ,  $XD = 6$  cm. and  $CD = 10$  cm. , then  $XB = \dots\dots\dots$  cm.



- (a) 4 (b) 8  
(c) 12 (d) 16

**(15) The angle with measure  $495^\circ$  in standard position is equivalent to angle with measure .....**

- (a)  $\frac{\pi}{4}$  (b)  $\frac{3\pi}{4}$  (c)  $\frac{5\pi}{4}$  (d)  $\frac{7\pi}{4}$

(16) In the opposite figure :

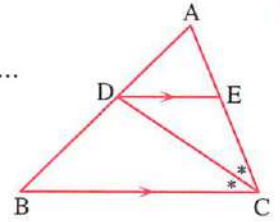
$\Delta ABC$  in which  $\overline{BC} \parallel \overline{DE}$ ,  $\overline{CD}$  bisects  $\angle ACB$ , then  $\frac{AE}{EC} = \dots\dots\dots$

(a)  $\frac{AD}{AB}$

(b)  $\frac{AD}{AE}$

(c)  $\frac{AC}{CB}$

(d)  $\frac{DE}{BC}$



(17) The terminal side of angle  $\theta$  in the standard position intersects the unit circle at

the point  $\left(\frac{\sqrt{5}}{3}, -\frac{2}{3}\right)$ , then  $\cos\left(\frac{\pi}{2} + \theta\right) + \sin(2\pi - \theta) = \dots\dots\dots$

(a) 0

(b)  $\frac{4}{3}$

(c)  $-\frac{4}{3}$

(d)  $\frac{5}{3}$

(18) In the opposite figure :

If  $\overline{LZ} \parallel \overline{YX} \parallel \overline{MN}$ ,  $XM = NL$

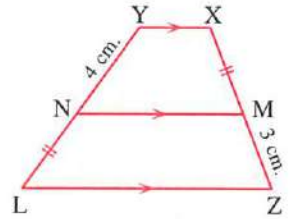
, then  $MX = \dots\dots\dots$  cm.

(a) 3

(b)  $2\sqrt{3}$

(c)  $3\sqrt{2}$

(d) 12



(19) The simplest form of  $i^{2022} = \dots\dots\dots$

(a)  $-i$

(b)  $-1$

(c)  $i$

(d) 1

(20) In the opposite figure :

A circle in which  $\overline{BA} \cap \overline{CD} = \{X\}$

, if  $m(\angle X) = 46^\circ$  and  $m(\widehat{BC}) = 150^\circ$

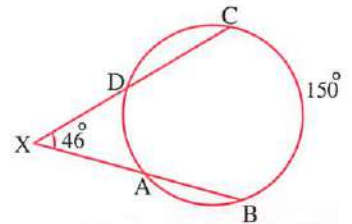
, then  $m(\widehat{AD}) = \dots\dots\dots$

(a)  $58^\circ$

(b)  $92^\circ$

(c)  $103^\circ$

(d)  $196^\circ$



(21) The function  $f : f(x) = (x-1)(x+4)$  is positive at  $x \in \dots\dots\dots$

(a)  $]-1, 4[$

(b)  $]-4, 1[$

(c)  $\mathbb{R} - ]-4, 1[$

(d)  $\mathbb{R} - [-4, 1]$

(22) If the two roots of the equation :  $x^2 + 4x + k = 0$  are real different , then  $k = \dots\dots\dots$

(a)  $]-\infty, 4[$

(b)  $]4, \infty[$

(c)  $]-\infty, 4]$

(d)  $\{4\}$

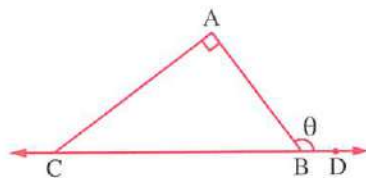
**(23) In the opposite figure :**

ABC is right-angled triangle at A ,  $D \in \overrightarrow{BC}$

if  $AB = 12$  cm. ,  $AC = 16$  cm. , then  $\tan \theta = \dots\dots\dots$

- (a)  $\frac{3}{4}$   
(c)  $\frac{4}{3}$

- (b)  $\frac{-3}{4}$   
(d)  $\frac{-4}{3}$



**(24) If the two roots of the equation :  $4X^2 - 20X + m = 0$  are equal , then  $m = \dots\dots\dots$**

- (a) 5 (b) 16 (c) 20 (d) 25

**(25) If one of the two roots of :  $X^2 - (b + 4)X - 9 = 0$  is additive inverse of the other , then  $b = \dots\dots\dots$**

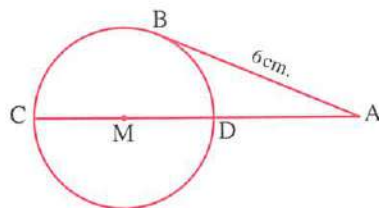
- (a) -4 (b) 0 (c) 4 (d) -9

**(26)  $\overrightarrow{AB}$  is a tangent to M at B ,  $AB = 6$  cm.**

If the radius is 2.5 , then  $AD = \dots\dots\dots$  cm.

- (a) 4  
(c) 9

- (b) 5  
(d) 36



**(27) If  $\sin(\theta + 10^\circ) = \cos(40^\circ)$  , where  $\theta \in \left] \frac{\pi}{2}, \pi \right[$  , then  $\theta = \dots\dots\dots$**

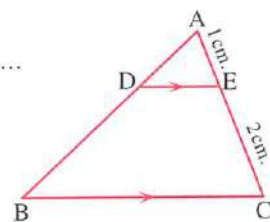
- (a)  $40^\circ$  (b)  $50^\circ$  (c)  $120^\circ$  (d)  $130^\circ$

**(28) In the opposite figure :**

$\Delta ABC$  in which  $\overrightarrow{BC} \parallel \overrightarrow{DE}$  , then  $\frac{\text{area of } \Delta ADE}{\text{area of trapezium (BDEC)}} = \dots\dots\dots$

- (a)  $\frac{1}{2}$   
(c)  $\frac{1}{9}$

- (b)  $\frac{1}{4}$   
(d)  $\frac{1}{8}$



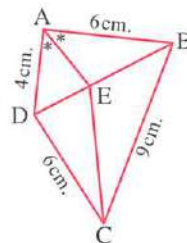
**Second Essay questions**

**Answer the following questions :**

**1 In the opposite figure :**

ABCD is a quadrilateral in which  $AB = 6$  cm. ,  $BC = 9$  cm. ,  $CD = 6$  cm. and  $AD = 4$  cm. If  $\overrightarrow{AE}$  bisects  $\angle A$  and intersects  $\overrightarrow{BD}$  at E

**Prove that :  $\overrightarrow{CE}$  bisects  $\angle BCD$**



**2  $\overrightarrow{AB}$  is a diameter of a circle whose radius length is 12 cm. , the chord  $\overrightarrow{AC}$  is draw such that  $m(\angle BAC) = 50^\circ$  , find the length of the arc  $(\widehat{AC})$**

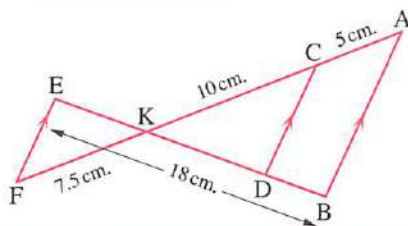
- 3 If  $L + 3$  and  $M + 3$  are the roots of the equation  $X^2 - 12X + 3 = 0$  find the equation whose roots are  $L$  and  $M$

4 In the opposite figure :

$\overline{BA} \parallel \overline{DC} \parallel \overline{EF}$ , where  $AC = 5$  cm.

,  $EB = 18$  cm. ,  $CK = 10$  cm. and  $KF = 7.5$  cm.

Find the length of  $\overline{DB}$  and  $\overline{KE}$



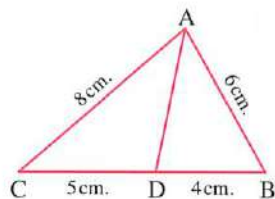
5 In the opposite figure :

$ABC$  is a triangle in which  $D \in \overline{BC}$  where  $BD = 4$  cm.

,  $DC = 5$  cm. , and  $AB = 6$  cm.

,  $AC = 8$  cm.

Prove that :  $\triangle ABC \sim \triangle DBA$  , then find  $AD$



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Cairo Governorate

Futures Language Schools  
Mathematics department

First

## Multiple choice questions

Choose the correct answer from the given ones :

- (1) If  $X = 3$  is one root of the equation :  $3X^2 - 8X + m = 0$  , then  $m = \dots\dots\dots$   
 (a) 3 (b) -3 (c) 5 (d) -5
- (2) The quadratic equation whose two roots are 8 , -13 is .....  
 (a)  $X^2 - 5X + 104 = 0$  (b)  $X^2 - 5X - 104 = 0$   
 (c)  $X^2 + 5X - 104 = 0$  (d)  $X^2 + 5X + 104 = 0$
- (3) The simplest form of the imaginary number  $i^{15} = \dots\dots\dots$   
 (a) i (b) -i (c) 1 (d) -1
- (4) The function  $f : f(X) = 12 - 3X$  is negative on the interval .....  
 (a)  $[-4, \infty[$  (b)  $]-\infty, 4[$  (c)  $]4, \infty[$  (d)  $]-\infty, -4]$
- (5) The expression  $(13 - 2i) - (3 - i)$  in the form of the number  $a + bi$  is .....  
 (a)  $10i$  (b)  $-10i$  (c)  $10 + i$  (d)  $10 - i$
- (6) The two roots of the equation :  $X^2 - 4X + k = 0$  are equal if  $k = \dots\dots\dots$   
 (a) 1 (b) 4 (c) 8 (d) 6
- (7) The solution set of the equation :  $X^2 = X$  in  $\mathbb{R}$  is .....  
 (a)  $\{0\}$  (b)  $\{1\}$  (c)  $\{-1, 1\}$  (d)  $\{0, 1\}$

(8) The sign of the function  $f : f(x) = x^2 + 2$  is positive in .....

- (a)  $\mathbb{R}$  (b)  $\mathbb{R}^+$  (c)  $\mathbb{R} - \{0\}$  (d)  $\mathbb{R} - \{2\}$

(9) If  $(2 - i)$  is a root of the equation :  $x^2 + b x + 5 = 0$  , then  $b =$  .....

- (a)  $2 + i$  (b)  $5$  (c)  $-4$  (d)  $-2 i$

(10) The measure of the central angle subtended an arc of length  $2\pi$  in a circle of diameter length 12 cm. is equal to .....

- (a)  $\frac{\pi}{6}$  (b)  $\frac{\pi}{5}$  (c)  $\frac{\pi}{3}$  (d)  $\frac{\pi}{2}$

(11) If  $\sin x < 0$  ,  $\tan x > 0$  , then  $x$  lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

(12) If  $\sin \theta = -1$  and  $\cos \theta = \text{zero}$  , then  $\theta =$  .....

- (a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$

(13) If  $0^\circ < \theta < 20^\circ$  and  $\sin(5\theta) = \cos(4\theta)$  , then  $\theta =$  .....

- (a)  $14^\circ$  (b)  $18^\circ$  (c)  $12^\circ$  (d)  $10^\circ$

(14)  $f(x) = 3 \sin x$  , for each  $x \in \mathbb{R}$  , then the maximum possible value of the function  $f(x) =$  .....

- (a)  $-3$  (b)  $3$  (c)  $1$  (d) zero

(15) If  $\csc \theta = -2$  ,  $270^\circ < \theta < 360^\circ$  , then  $\theta =$  .....

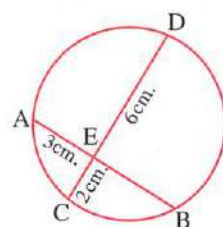
- (a)  $30^\circ$  (b)  $300^\circ$  (c)  $330^\circ$  (d)  $210^\circ$

(16) In the opposite figure :

If  $AE = 3 \text{ cm.}$  ,  $EC = 2 \text{ cm.}$

and  $ED = 6 \text{ cm.}$  , then  $EB =$  .....

- (a) 5 (b) 4  
(c) 6 (d) 3



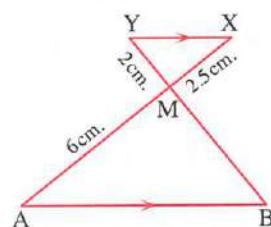
(17) If the ratio between the perimeter of two similar triangles is  $1 : 4$  , then the ratio between their two areas equals .....

- (a)  $1 : 2$  (b)  $1 : 4$  (c)  $1 : 8$  (d)  $1 : 16$

(18) In the opposite figure :

$\overrightarrow{AX} \cap \overrightarrow{YB} = \{M\}$  ,  $\overrightarrow{XY} \parallel \overrightarrow{AB}$  , then  $MB =$  .....

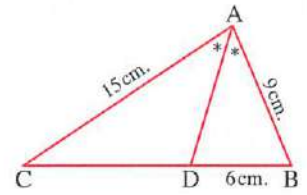
- (a) 3.6 cm. (b) 4 cm.  
(c) 4.2 cm. (d) 4.8 cm.



(19) In the opposite figure :

DC = ..... cm.

- (a) 10 (b) 6  
(c) 9 (d) 5



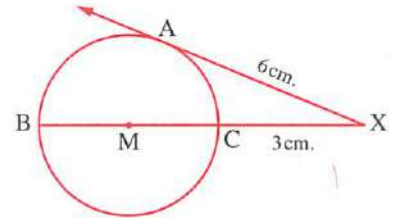
(20) In the opposite figure :

$\overrightarrow{XA}$  is a tangent to circle M

,  $XA = 6$  cm. ,  $XC = 3$  cm.

, then the area of the circle = .....  $\text{cm}^2$

- (a)  $36\pi$  (b)  $81\pi$  (c)  $20.25\pi$  (d)  $6.25\pi$



(21) If A is a point on the plane of the circle M of radius length 3 cm. and  $AM = 4$  cm.

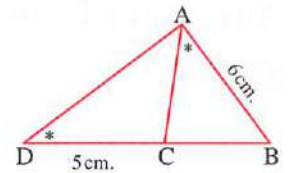
, then  $P_M(A) = \dots\dots\dots$

- (a) 16 (b) 9 (c) 25 (d) 7

(22) In the opposite figure :

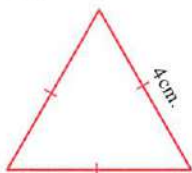
$m(\angle BAC) = m(\angle D)$  , then  $BC = \dots\dots\dots$

- (a) 3 cm. (b) 4 cm.  
(c) 5 cm. (d) 6 cm.



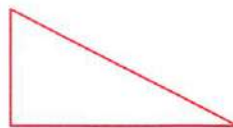
(23) Which of the following triangles are similar .....

①



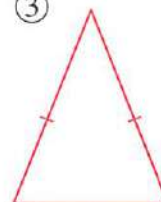
(a) ① and ④

②



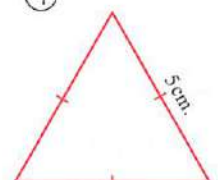
(b) ② and ④

③



(c) ① and ③

④



(d) ③ and ④

(24) If  $\triangle XYZ \sim \triangle ABC$  , a  $(\triangle XYZ) = 3$  a  $(\triangle ABC)$  and  $XY = 3$  cm.

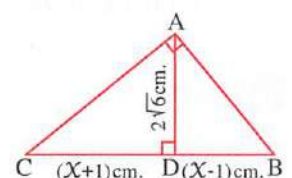
, then  $AB = \dots\dots\dots$  cm.

- (a)  $\sqrt{3}$  (b)  $3\sqrt{3}$  (c)  $\frac{1}{\sqrt{3}}$  (d) 1

(25) In the opposite figure :

$XC = \dots\dots\dots$  cm.

- (a) 6 (b) 7  
(c) 5 (d) 8



(26) The exterior bisector at the vertex of an isosceles triangle is ..... to the base.

- (a) Parallel (b) equal (c) perpendicular (d) bisector

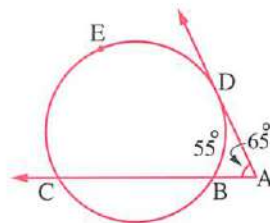
(27) All ..... are similar.

- (a) triangles. (b) squares.  
(c) rectangles. (d) parallelograms.

(28) In the opposite figure :

$\overrightarrow{AD}$  is a tangent,  $\overrightarrow{AC}$  intersects the circle at B, C,  $m(\angle A) = 65^\circ$ ,  $m(\widehat{BD}) = 55^\circ$ ,  $m(\widehat{DEC}) = (3x + 5)^\circ$ , then  $x =$  .....

- (a)  $60^\circ$  (b)  $70^\circ$  (c)  $35^\circ$  (d)  $84^\circ$



## Second Essay questions

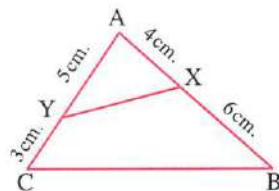
Answer the following questions :

1 In the opposite figure :

(1) Prove that :  $\triangle AXY \sim \triangle ACB$

(2) If the area of  $(\triangle AXY) = 8 \text{ cm}^2$

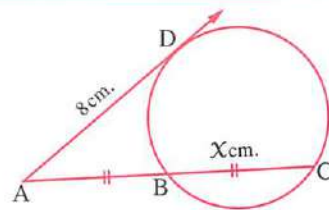
, find the area of the polygon XBCY



2 In the opposite figure :

If  $AD = 8 \text{ cm}$ ,  $AB = BC = x \text{ cm}$ .

, then find the value of  $x$



3 State two cases of similarity of two triangles.

4 If L, M are the roots of the equation :  $3x^2 - 2x - 7 = 0$

, find the equation whose roots are  $L^2$ ,  $M^2$

5 If  $4 \tan A - 3 = 0$  where A is the greatest positive angle,  $A \in ]0, 2\pi[$ , then without using calculator find the value of  $\sin(180^\circ - A) + \cos(-A) + \cot(360^\circ - A)$

### 3 Cairo Governorate



Elkalifa and Elmokattam Educational Zone  
Mathematics supervisor

#### First Multiple choice questions

Choose the correct answer from the given ones :

(1) In circle M if  $MA = 5$  cm. , diameter of circle = 6 cm. , then  $P_M(A) = \dots\dots\dots$

- (a) 16 (b) - 9 (c) 9 (d) - 16

(2) If  $X = 4 + 2i$  ,  $y = 4 - 2i$  , then  $XY = \dots\dots\dots$

- (a) 12 (b) 24 (c) 20 (d)  $20i$

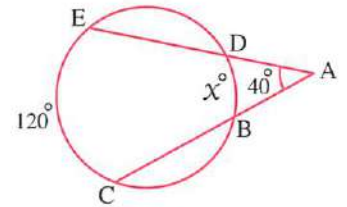
(3) In the opposite figure :

$$m(\angle A) = 40^\circ$$

$$, m(\widehat{EC}) = 120^\circ$$

$$, \text{ then } X = \dots\dots\dots^\circ$$

- (a) 40 (b) 60 (c) 120 (d) 170



(4) The solution set of the inequality :  $X^2 - 3X + 2 \geq 0$  is  $\dots\dots\dots$

- (a)  $[1, 2]$  (b)  $\mathbb{R} - ]-2, -1[$  (c)  $\mathbb{R} - ]1, 2[$  (d)  $[-2, -1]$

(5) If the ratio between two corresponding sides of two similar polygons equals  $1 : 3$  and the difference between their surface areas  $200 \text{ cm}^2$  , then area of smaller polygon =  $\dots\dots\dots \text{ cm}^2$

- (a) 25 (b) 90 (c) 225 (d) 100

(6) The angle whose measure  $1087^\circ$  lies in the  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

(7) Two similar triangles the ratio between their perimeters  $5 : 3$  , then the ratio between their areas is  $\dots\dots\dots$

- (a)  $5 : 3$  (b)  $3 : 5$  (c)  $9 : 25$  (d)  $25 : 9$

(8) The simplest form of expression  $(1 + i)^8$  is  $\dots\dots\dots$

- (a) 16 (b) - 16 (c)  $16i$  (d)  $-16i$

(9) The interior and exterior bisectors of angle of triangle include between them angle of measure  $\dots\dots\dots$

- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $120^\circ$  (d)  $90^\circ$

(10) The S.S. of equation :  $X^2 + 16 = 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{-2\}$  (b)  $\{2\}$  (c)  $\{-2, 2\}$  (d)  $\emptyset$

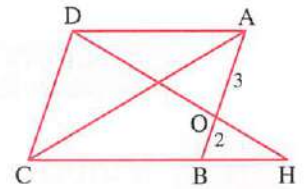
**(11) In the opposite figure :**

ABCD is parallelogram  $AO : OB = 3 : 2$

area of  $\triangle DHC = 100 \text{ cm}^2$

, then area of  $\triangle ODA = \dots\dots\dots \text{cm}^2$

- (a) 36 (b) 48 (c) 60 (d) 90



**(12) If  $f : f(x) = 4 \sin 2x$  , then the greatest possible value of  $f$  is .....**

- (a) 1 (b) zero (c) 4 (d) 8

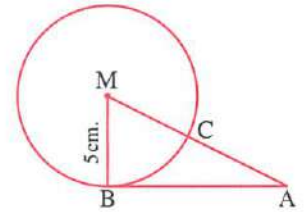
**(13) In the opposite figure :**

If  $P_M(A) = 144$

,  $BM = 5 \text{ cm}$ .

, then  $AC = \dots\dots\dots \text{cm}$ .

- (a) 18 (b) 8 (c) 12 (d) 16



**(14) The sign of function  $f : f(x) = x - 5$  is positive in the interval .....**

- (a)  $]-\infty, 5[$  (b)  $]5, \infty[$  (c)  $[-5, \infty[$  (d)  $]-\infty, -5[$

**(15) If L and M are the two roots of the equation :  $x^2 + 3x - 4 = 0$  , the numerical value of the expression :  $L^2 + 3L + 5 = \dots\dots\dots$**

- (a) -9 (b) -4 (c) -1 (d) 9

**(16) If  $\tan(180^\circ + 5\theta) + \tan(270^\circ + 4\theta) = 0$  , then value of  $\theta$  which satisfy the equation where  $\theta \in ]0, 2\pi[$  could be equal .....**

- (a)  $5^\circ$  (b)  $10^\circ$  (c)  $20^\circ$  (d)  $90^\circ$

**(17) If one of the two roots of the equation :  $3x^2 - (k+2)x + k^2 + 2k = 0$  is multiplicative inverse of the other root , then  $k = \dots\dots\dots$**

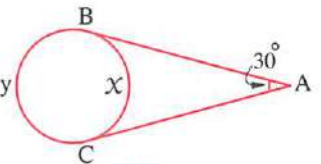
- (a) -3 , 1 (b) -3 , -1 (c) 3 , -1 (d) 3 , 1

**(18) In the opposite figure :**

$\overline{AB}$  ,  $\overline{AC}$  are two tangent segments to the circle ,  $m(\angle A) = 30^\circ$

, then  $y^2 - x^2 = \dots\dots\dots$

- (a) 30 (b) 60 (c) 21600 (d) 10800



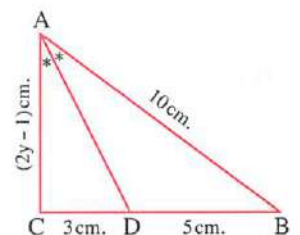
**(19) In the opposite figure :**

$\overline{AD}$  bisects  $\angle A$  ,  $\frac{BD}{DC} = \frac{5}{3}$

If  $AB = 10 \text{ cm}$  ,  $AC = (2y - 1) \text{ cm}$ .

, then  $y = \dots\dots\dots \text{cm}$ .

- (a) 1.5 (b) 3.5  
(c) 6 (d) 10



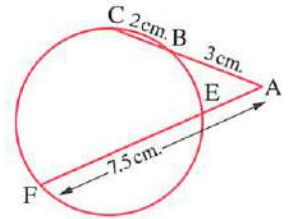
(20) In the opposite figure :

$AB = 3 \text{ cm.}$  ,  $BC = 2 \text{ cm.}$

,  $AF = 7.5 \text{ cm.}$

, then  $EF = \dots\dots\dots$

- (a) 2 (b) 3 (c) 5.5 (d) 7.5



(21) All  $\dots\dots\dots$  are similar.

- (a) triangles (b) rectangles (c) squares (d) parallelograms

(22) The sign of the function  $f$  , where :  $f(x) = x^2 - 2x - 3$  is negative when  $x \in \dots\dots\dots$

- (a)  $]-\infty, -1[$  (b)  $]-1, 3[$  (c)  $\mathbb{R} - [-1, 3]$  (d)  $]3, \infty[$

(23) If the two roots of the equation :  $kx^2 - 12x + 9 = 0$  are equal , then  $\dots\dots\dots$

- (a)  $k < 4$  (b)  $k = 4$  (c)  $k > 4$  (d)  $k = 144$

(24) If the two roots of the equation :  $8x^2 - ax + 3 = 0$  are positive and the ratio between them is  $2 : 3$  , then  $a = \dots\dots\dots$

- (a) 1 (b) -1 (c) -10 (d) 10

(25) If  $\theta \in \left] \frac{\pi}{2}, \pi \right[$  ,  $\sin \theta = \frac{12}{13}$  , then the value of :

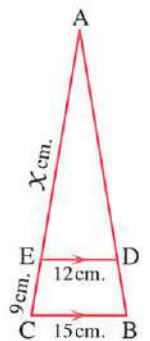
$\csc \theta \sin \theta - \tan \theta \cot \theta + \cos^2 \theta = \dots\dots\dots$

- (a)  $\frac{169}{25}$  (b)  $\frac{144}{169}$  (c)  $\frac{25}{169}$  (d)  $\frac{169}{144}$

(26) In the opposite figure :

$x = \dots\dots\dots$

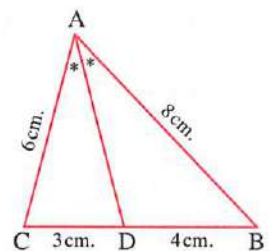
- (a) 32  
(b) 40  
(c) 36  
(d) 10



(27) In the opposite figure :

$AD = \dots\dots\dots \text{ cm.}$

- (a) 4 (b) 8  
(c) 6 (d) 5



**(28) In the opposite figure :**

ABC is a right angled triangle at A

,  $\overline{AD} \perp \overline{BC}$  , AB = 30 cm. , CD = 32 cm.

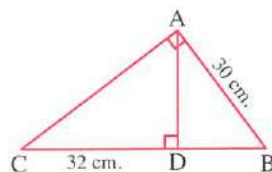
, then AD = ..... cm.

(a) 18

(b) 25

(c) 24

(d) 20



**Second Essay questions**

**Answer the following questions :**

**1** If L , M are two roots of equation :  $x^2 - 3x + 5 = 0$  , form equation whose roots are  $L^2$  ,  $M^2$

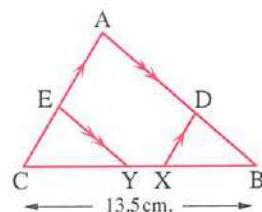
**2** Find circumference of circle which contains central angle of measure  $120^\circ$  and subtends arc of length 6 cm.

**3 In the opposite figure :**

$\overline{DX} \parallel \overline{AC}$  ,  $\overline{EY} \parallel \overline{AB}$

, BC = 13.5 cm. ,  $\frac{AD}{DB} = \frac{3}{2}$  ,  $\frac{EC}{AE} = \frac{4}{5}$

, then find the length of XY



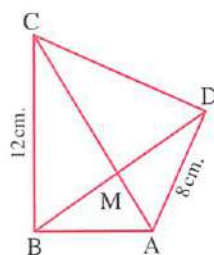
**4 In the opposite figure :**

ABCD is cyclic quadrilateral

, AD = 8 cm.

, CB = 12 cm.

**Find :** Area ( $\Delta$  AMD) : Area ( $\Delta$  BMC)



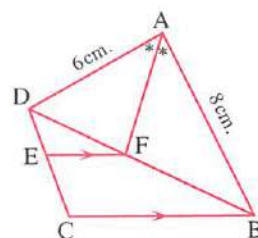
**5 In the opposite figure :**

$\overrightarrow{AF}$  bisects  $\angle$  BAD

,  $\overline{EF}$  parallel to  $\overline{BC}$

, AB = 8 cm. , AD = 6 cm.

**Find :**  $\frac{DE}{EC}$



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**First Multiple choice questions**

Choose the correct answer from the given ones :

- (1) If  $L$ ,  $3 - L$  are the two roots of the equation :  $X^2 + aX - 7 = 0$  , then  $a = \dots\dots\dots$   
 (a)  $-3$  (b)  $3$  (c)  $-5$  (d)  $5$
- (2) If the length of an arc in a circle equals quarter of its circumference , then the measure of its inscribed angle subtended to this arc equals  $\dots\dots\dots$   
 (a)  $\frac{\pi}{2}$  (b)  $\frac{\pi}{3}$  (c)  $\frac{\pi}{4}$  (d)  $\frac{\pi}{6}$
- (3) The maximum value of  $f : f(X) = 2 + 3 \sin 2\theta$  is  $\dots\dots\dots$  where  $\theta \in [0, 2\pi[$   
 (a)  $5$  (b)  $-5$  (c)  $3$  (d)  $-3$
- (4) If  $3 + 2i$  is one of the roots of  $X^2 - aX + b = 0$  , then  $a + b = \dots\dots\dots$   
 where  $a, b \in \mathbb{R}$   
 (a)  $-7$  (b)  $7$  (c)  $19$  (d)  $6$
- (5) If  $\sin \theta = -0.6$  ,  $\theta \in ]\pi, \frac{3\pi}{2}[$  , then  $\tan \theta + \cos \theta = \dots\dots\dots$   
 (a)  $\frac{27}{20}$  (b)  $\frac{31}{20}$  (c)  $\frac{1}{20}$  (d)  $-\frac{1}{20}$
- (6) If  $\tan(2\theta + 15^\circ) = \cot(\theta + 30^\circ)$  ,  $\theta \in ]0, \frac{\pi}{4}[$  , then  $\sin^2 3\theta + \tan^2 4\theta = \dots\dots\dots$   
 (a)  $3.5$  (b)  $-3.5$  (c)  $2.5$  (d)  $-2.5$
- (7) If one of the roots of the equation :  $(2a - 5)X^2 + 7X + a = 0$  is multiplicative inverse of the other root , then  $a = \dots\dots\dots$   
 (a)  $-6$  (b)  $6$  (c)  $5$  (d)  $-5$
- (8) The solution set of the equation :  $X^2 + 16 = 0$  is  $\dots\dots\dots$  where  $X \in \mathbb{R}$   
 (a)  $\{4i, -4i\}$  (b)  $\{4, -4\}$  (c)  $\{-4\}$  (d)  $\emptyset$
- (9) If  $13 \sin \theta + 5 = 0$  ,  $\theta$  is greatest positive angle in  $[0, 360^\circ[$   
 , then  $\sin(90^\circ + \theta) \tan(360^\circ - \theta) = \dots\dots\dots$   
 (a)  $\frac{12}{13}$  (b)  $-\frac{12}{13}$  (c)  $\frac{5}{13}$  (d)  $-\frac{5}{13}$
- (10) If one of the roots of the equation :  $X^2 - 9X + m = 0$  is double the other root  
 , then  $m = \dots\dots\dots$   
 (a)  $18$  (b)  $20$  (c)  $14$  (d)  $26$

- (11) Solution set of the equation  $2 \cos \theta + \sqrt{2} = 0$  is ..... where  $\theta \in [0, 2\pi[$   
 (a)  $\left\{\frac{\pi}{4}\right\}$  (b)  $\left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\}$  (c)  $\left\{\frac{3\pi}{4}, \frac{5\pi}{4}\right\}$  (d)  $\left\{\frac{5\pi}{4}\right\}$

- (12) If  $(a + ib)(3 + 4i) = (2 + i)(2 - i)$ , then  $a^2 + b^2 = \dots\dots\dots$

(a) -1 (b) 1 (c) -2 (d) 2

- (13) If  $\Delta ABC \sim \Delta XYZ$ , area  $(\Delta ABC) = 9$  area  $(\Delta XYZ)$ , then  $AB = \dots\dots\dots$

(a) 9 XY (b) 3 XY (c) 3 YZ (d) 3 XZ

- (14) If  $X = 3$  is one of the roots of the equation :  $X^2 + 2mX = 3$ , then  $m = \dots\dots\dots$

(a) -1 (b) 1 (c) 2 (d) -2

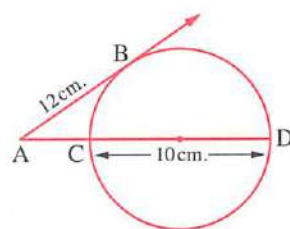
- (15) In the opposite figure :

$\overline{AB}$  is a tangent its length 12 cm.

$\overline{CD}$  is a diameter of length 10 cm.

, then  $AC = \dots\dots\dots$

(a) 10 cm. (b) 8 cm. (c) 18 cm. (d) 6 cm.



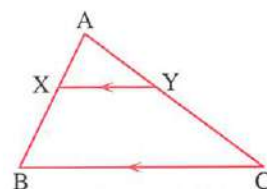
- (16) In the opposite figure :

$\overline{XY} \parallel \overline{BC}$ ,  $AX : XB = 2 : 3$

, area of  $\Delta AXY = 16 \text{ cm}^2$

, then the area of trapezium XYCB = .....  $\text{cm}^2$

(a) 36 (b) 32 (c) 84 (d) 40



- (17) If  $L, M$  are the two roots of the equation :  $X^2 - 5X + 3 = 0$ , then the equation whose roots  $3L, 3M$  is .....

(a)  $X^2 + 15X + 27 = 0$

(b)  $X^2 - 15X + 9 = 0$

(c)  $X^2 - 15X + 27 = 0$

(d)  $X^2 - 9X + 15 = 0$

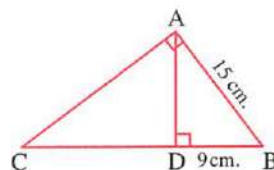
- (18) In the opposite figure :

$m(\angle CAB) = m(\angle ADB) = 90^\circ$

,  $AB = 15 \text{ cm}$ ,  $BD = 9 \text{ cm}$ .

, then  $AC + AD = \dots\dots\dots \text{cm}$ .

(a) 28 (b) 25 (c) 35 (d) 32



- (19) The solution set of the inequality :  $X^2 + 9 < 0$  is .....

(a)  $\emptyset$

(b)  $[-3, 3]$

(c)  $\mathbb{R} - [-3, 3]$

(d)  $\mathbb{R} - \{-3, 3\}$

(20) In the opposite figure :

$$\overline{AC} \cap \overline{BD} = \{X\}, AX = XC$$

$$, DX = 4 \text{ cm.}, XB = 9 \text{ cm.}$$

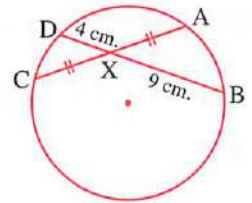
$$, \text{ then } AC = \dots\dots\dots \text{ cm.}$$

(a) 6

(b) 13

(c) 12

(d) 18



(21) In the opposite figure :

$$\text{If } m(\widehat{AB}) = 100^\circ, m(\widehat{CD}) = 120^\circ$$

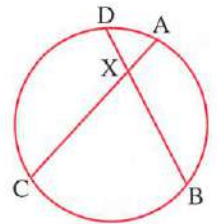
$$, \text{ then } m(\angle AXD) = \dots\dots\dots$$

(a)  $110^\circ$

(b)  $70^\circ$

(c)  $140^\circ$

(d)  $180^\circ$



(22) In the opposite figure :

$$AD = 6 \text{ cm.}, AB = 5 \text{ cm.}$$

$$, BC = 7 \text{ cm.}$$

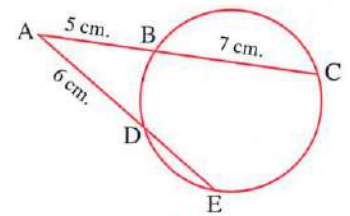
$$, \text{ then } DE = \dots\dots\dots \text{ cm.}$$

(a) 12

(b) 7

(c) 10

(d) 4



(23) In the figure of number (22) If  $m(\angle A) = 35^\circ$ ,  $m(\widehat{CE}) = 100^\circ$ , then  $m(\widehat{BD}) = \dots\dots\dots$

(a)  $30^\circ$

(b)  $70^\circ$

(c)  $100^\circ$

(d)  $40^\circ$

(24) In the opposite figure :

$$\overrightarrow{AD} \text{ is interior bisector of } \angle A$$

$$, AB = 12 \text{ cm.}$$

$$, AC = 15 \text{ cm.}, BD = 8 \text{ cm.}$$

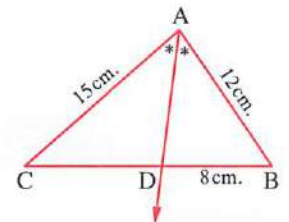
$$, \text{ then } CD = \dots\dots\dots \text{ cm.}$$

(a) 12

(b) 10

(c) 8

(d) 15



(25) In the figure of number (24) The ratio between area of  $\triangle ABD$  : area of  $\triangle ABC = \dots\dots\dots$

(a) 4 : 9

(b) 4 : 5

(c) 5 : 9

(d) 5 : 10

(26) In the figure of number (24) The length of  $\overline{AD} = \dots\dots\dots \text{ cm.}$

(a)  $\sqrt{10}$

(b) 8

(c) 10

(d)  $2\sqrt{2}$

(27) If M is a circle, A is a point in its plane where  $MA = 6 \text{ cm.}$ ,  $P_M(A) = -13$

$$, \text{ then area of circle M} = \dots\dots\dots \text{ cm}^2 \left( \pi = \frac{22}{7} \right)$$

(a) 154

(b) 44

(c) 144

(d) 7

(28)  $\overline{AB}$ ,  $\overline{AC}$  are two tangent to circle M,  $m(\widehat{BC}) = 120^\circ$ , then  $m(\angle A) = \dots\dots\dots$

(a)  $120^\circ$

(b)  $60^\circ$

(c)  $100^\circ$

(d)  $180^\circ$

## Second Essay questions

Answer the following questions :

1 Find in  $\mathbb{R}$  the solution set of the inequality :  $x^2 - 4x - 5 > 0$

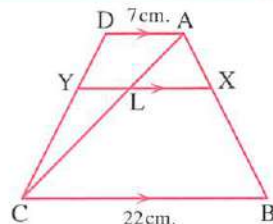
2 Solve the equation :  $\cos (\pi + \theta) = \sin (390^\circ) \cos (-60^\circ) + \cos (30^\circ) \sin (120^\circ)$

3 In the opposite figure :

$$\overline{AD} \parallel \overline{XY} \parallel \overline{BC}$$

$$, \frac{AX}{XB} = \frac{2}{3}$$

Find : XY

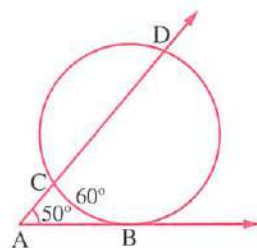


4 In the opposite figure :

$$m(\angle A) = 50^\circ$$

$$, m(\widehat{BC}) = 60^\circ$$

Find :  $m(\widehat{BD})$

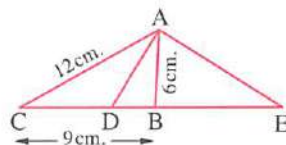


5 In the opposite figure :

$\overline{AD}$  and  $\overline{AE}$  are the interior and exterior bisectors of  $\angle CAB$  ,

$AC = 12$  cm. ,  $AB = 6$  cm. ,  $BC = 9$  cm.

Find the length of  $\overline{AE}$



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## First Multiple choice questions

Choose the correct answer from the given ones :

(1) In the opposite figure :

$\overline{AD}$  bisect  $(\angle EAC)$

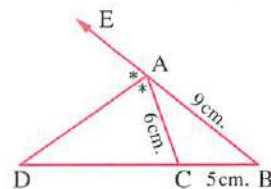
, then  $CD = \dots\dots\dots$  cm.

(a) 5

(b) 10

(c) 12

(d) 18



(2) If one root of the quadratic equation :  $a x^2 + 4x + 7 = 0$  is a multiplicative inverse of the other , then  $a = \dots\dots\dots$

(a)  $\frac{1}{7}$

(b) 7

(c) 4

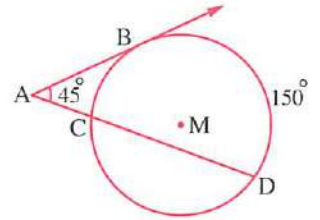
(d) -7

(3) In the opposite figure :

$$m(\widehat{BD}) = 150^\circ, m(\angle A) = 45^\circ$$

$$, \text{ then } m(\widehat{BC}) = \dots\dots\dots^\circ$$

- (a) 60 (b) 120  
(c) 90 (d) 195



(4) All the following measure of angles lie in the second quadrant except .....

- (a)  $-240$  (b)  $100$  (c)  $-120$  (d)  $860$

(5) If two roots of quadratic equation :  $x^2 - 6x + k = 0$  are equal and real , then  $k = \dots\dots\dots$

- (a) 4 (b)  $-4$  (c) 9 (d)  $-9$

(6) If  $P_M(A) > 0$  , then the point A located ..... the circle M.

- (a) inside (b) outside (c) on (d) on the centre of

(7) The measure of central angle subtended by arc of length  $\pi$  cm. in circle of diameter 8 cm. equal .....

- (a)  $\frac{\pi}{3}$  (b)  $\frac{\pi}{4}$  (c)  $\frac{2\pi}{3}$  (d)  $2\pi$

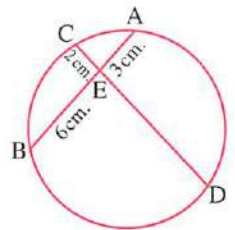
(8) If  $\overline{AB} \cap \overline{CD} = \{E\}$  ,

$$AE = 3 \text{ cm. , } CE = 2 \text{ cm.}$$

$$, BE = 6 \text{ cm.}$$

$$, \text{ then } ED = \dots\dots\dots \text{ cm.}$$

- (a) 9 (b) 8 (c) 7 (d) 6



(9) If the two similar polygons are congruent , then the scale factor is .....

- (a)  $\frac{1}{2}$  (b) 1 (c) more than 1 (d) less than 1

(10) The sign of function  $f : f(x) = 4 - 2x$  positive if .....

- (a)  $x > 4$  (b)  $x < 4$  (c)  $x > 2$  (d)  $x < 2$

(11) The range of function  $f : f(x) = 2 \cos 3x$  is .....

- (a)  $[-2, 2]$  (b)  $]2, 3[$  (c)  $]-2, 2[$  (d)  $]-3, 3[$

(12) If a line intersects two sides in a triangle and divides them into segments whose lengths are proportional , then it is ..... to the third side.

- (a) intersect (b) parallel (c) bisect (d) equal

- (13) If L and M are two roots of the quadratic equation :  $X^2 - 7X + 12 = 0$   
 , then  $L^2 + M^2 = \dots\dots\dots$

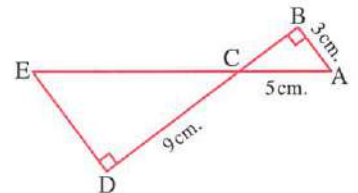
(a) 7 (b) 12 (c) 25 (d) 49

- (14) In the given figure :

If  $\overline{BD} \cap \overline{AE} = \{C\}$

, then :  $\frac{\text{the area of the smaller triangle}}{\text{the area of the greater triangle}} = \dots\dots\dots$

(a)  $\frac{25}{81}$  (b)  $\frac{1}{3}$   
 (c)  $\frac{16}{81}$  (d)  $\frac{9}{64}$



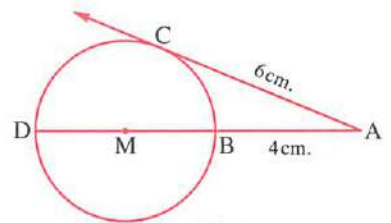
- (15) In the opposite figure :

$\overline{BD}$  is a diameter ,  $\overline{AC}$  is a tangent

,  $AC = 6$  cm. ,  $AB = 4$  cm.

, then the radius of circle equal  $\dots\dots\dots$  cm.

(a) 5 (b) 9 (c) 2.5 (d) 4



- (16) The solution set of the inequality :  $X^2 \leq 5X - 4$  in  $\mathbb{R} \dots\dots\dots$

(a)  $\mathbb{R} - ]1, 4[$  (b)  $\mathbb{R} - [1, 4]$  (c)  $[1, 4]$  (d)  $]1, 4[$

- (17) If the ratio between the perimeter of two similar triangles is 4 : 9 , then the ratio between their areas is  $\dots\dots\dots$

(a) 4 : 3 (b) 4 : 9 (c) 16 : 81 (d) 3 : 2

- (18) If  $\sin \theta = \cos B$  and  $\theta$  , B are two acute angles , then  $\tan (\theta + B) = \dots\dots\dots$

(a) -1 (b) 1 (c)  $\sqrt{3}$  (d) undefind.

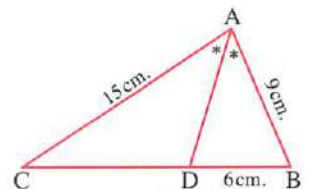
- (19) If  $X = 5$  is one of the two roots of the equation :  $X^2 + aX = 2a + 4$   
 , then a =  $\dots\dots\dots$

(a) -7 (b) 7 (c)  $\frac{29}{3}$  (d)  $-\frac{29}{3}$

- (20) In the opposite figure :

The length of  $\overline{CD} = \dots\dots\dots$  cm.

(a) 5 (b) 6  
 (c) 9 (d) 10



- (21) If the terminal side of the angle  $\theta$  in the standard position intersects the unit circle at the point  $(X, -X)$  ,  $X > 0$  , then  $m(\angle \theta) = \dots\dots\dots$

(a)  $225^\circ$  (b)  $315^\circ$  (c)  $135^\circ$  (d)  $45^\circ$

- (22)  $(1 + i)^4 - (1 - i)^4 = \dots\dots\dots$

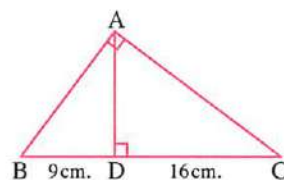
(a) zero (b) 8 (c) -8 (d) 4

(23) In the opposite figure :

$$\overline{AC} \perp \overline{AB}, \overline{AD} \perp \overline{BC}$$

, the length of  $\overline{AB}$  = ..... cm.

- (a) 12 (b) 15  
(c) 20 (d) 25



(24) If L, M are the roots of the equation :  $x^2 - 7x + 3 = 0$ , then the equation whose roots 2L, 2M is .....

- (a)  $x^2 - 14x + 12 = 0$  (b)  $x^2 - 14x - 12 = 0$   
(c)  $x^2 + 14x + 12 = 0$  (d)  $x^2 + 14x - 12 = 0$

(25) If  $\triangle ABC$  is right-angled triangle at B,  $\cos C = \frac{1}{2}$ , then  $\sin(A + B + 2C)$  .....

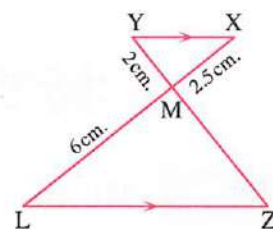
- (a)  $\frac{1}{2}$  (b)  $-\frac{1}{2}$  (c)  $-\frac{\sqrt{3}}{2}$  (d) zero

(26) In the opposite figure :

$$\overrightarrow{XL} \cap \overrightarrow{YZ} = \{M\}, \overrightarrow{XY} \parallel \overrightarrow{ZL}$$

, then the length of  $\overline{MZ}$  .....

- (a) 3.6 (b) 4  
(c) 4.2 (d) 4.8

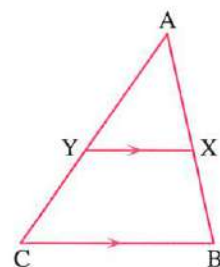


(27) If 2 and 7 are two roots the equation :  $x^2 + ax + b = 0$ , then  $a + b =$  .....

- (a) 5 (b) -5 (c) 23 (d) -23

(28) All of the following mathematical expressions are true except .....

- (a)  $\frac{AX}{XB} = \frac{XY}{BC}$  (b)  $\frac{AX}{AB} = \frac{XY}{BC}$   
(c)  $\frac{AY}{YC} = \frac{AX}{XB}$  (d)  $\frac{AY}{AC} = \frac{AX}{AB}$



## Second Essay questions

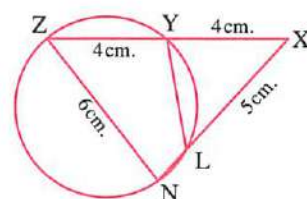
Answer the following questions :

1 In the opposite figure :

$XL = 5$  cm. ,  $XY = YZ = 4$  cm. ,  $NZ = 6$  cm.

Find with proof :

The length of  $\overline{LN}$ ,  $\overline{YL}$

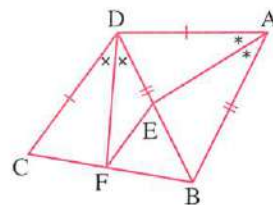


**2 In the opposite figure :**

ABCD is a quadrilateral

,  $AB = BD$  ,  $AD = DC$  ,  $\overrightarrow{AE}$  bisects  $\angle A$  ,  $\overrightarrow{DF}$  bisects  $\angle BDC$

**Prove that :**  $\overline{EF} \parallel \overline{DC}$



**3 Find the solution set of the equation :  $x^2 - 2x + 4 = 0$  in  $\mathbb{C}$**

**4 If the difference between two complements angles is  $\frac{\pi}{3}$  find the degree and radian measure of the two angles.**

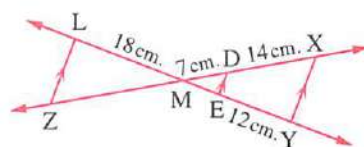
**5 In the opposite figure :**

$\overline{XY} \parallel \overline{DE} \parallel \overline{LZ}$

**Find with proof :**

the length of  $\overline{EM}$

, the length of  $\overline{MZ}$



**6**

**Giza Governorate**



**Inspection of Math**

**First Multiple choice questions**

**Choose the correct answer from the given ones :**

**(1)** If one of the two roots of the equation :  $3x^2 + (a+3)x + 7 = 0$

is the additive inverse of the other , then :  $a = \dots\dots\dots$

(a)  $-3$

(b)  $3$

(c)  $\frac{1}{3}$

(d)  $-\frac{1}{3}$

**(2)** If  $(3x - y) + (x + y)i = \frac{2}{1+i}$  , then  $y - x = \dots\dots\dots$

(a) zero

(b)  $-1$

(c)  $1$

(d)  $i$

**(3)** If the two roots of the equation :  $x^2 + 4x + k = 0$  are real and different , then  $k \in \dots\dots\dots$

(a)  $]4, \infty[$

(b)  $]-\infty, 4[$

(c)  $]-\infty, \infty[$

(d)  $[4, \infty[$

**(4)** The solution set of the inequality :  $(x-3)(x-7) < 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

(a)  $\{3, 7\}$

(b)  $]3, 7[$

(c)  $[3, 7]$

(d)  $\mathbb{R} - [3, 7]$

**(5)** If  $(2+i)$  is one of the two roots of the equation :  $x^2 - 4x + c = 0$  , then the value of  $c = \dots\dots\dots$

(a)  $16$

(b)  $-16$

(c)  $-5$

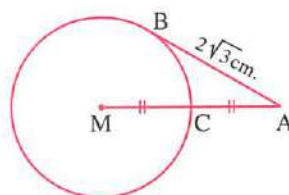
(d)  $5$

- (6) The quadratic equation whose two roots are  $(2 - 3i)$ ,  $(2 + 3i)$  is .....
- (a)  $x^2 - 4x + 13 = 0$  (b)  $x^2 + 4x + 13 = 0$   
 (c)  $x^2 + 4x - 13 = 0$  (d)  $x^2 - 4x - 13 = 0$
- (7) If  $L$  is one of the two root of the equation :  $x^2 - 4x + 1 = 0$ , then the numerical value the expression :  $L^2 - 4L + 5$  is .....
- (a) 4 (b) -4 (c) 5 (d) -5
- (8) If  $f(x) = x + 2$ , where :  $x \in ]-4, 3[$ , then  $f(x)$  is negative when  $x \in$  .....
- (a)  $[-4, -2]$  (b)  $] -4, -2[$  (c)  $[-2, 3]$  (d)  $] -2, 3[$
- (9) The conjugate number of :  $3i - 7$  equals .....
- (a)  $3i + 7$  (b)  $-3i - 7$  (c)  $-3i + 7$  (d)  $\frac{1}{3i - 7}$
- (10) The range of the function  $f : f(\theta) = 4 \sin 2\theta$  where  $\theta \in [0, 2\pi[$  equals .....
- (a)  $[-4, 4]$  (b)  $] -4, 4[$  (c)  $[-2, 2]$  (d)  $] -2, 2[$
- (11) If the terminal side of the angle of measure  $30^\circ$  in the standard position in the unit circle rotates three and half revolutions clockwise, then the terminal side lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (12) If  $\cos \theta > 0$ ,  $\sin \theta < 0$ , then  $\theta$  lies in the .....quadrant.
- (a) first (b) second (c) third (d) fourth
- (13) The angle of measure  $\frac{5\pi}{9}$  lies in the ..... quadrant.
- (a) first (b) second (c) third (d) fourth
- (14) The arc of length  $8k\pi$  cm. in a circle whose radius of length  $24k$  cm. is subtends an inscribed angle of measure .....
- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $120^\circ$  (d)  $(60k)^\circ$
- (15) If the ratio between the perimeters of two similar polygons 4 : 9, then the ratio between their surface areas = .....
- (a) 2 : 3 (b) 4 : 13 (c) 16 : 81 (d) 4 : 9
- (16) Any two regular polygons having the same number of sides are .....
- (a) congruent. (b) equal in area.  
 (c) equal in perimeter. (d) similar.

**(17) In the opposite figure :**

The radius length of circle M = ..... cm.

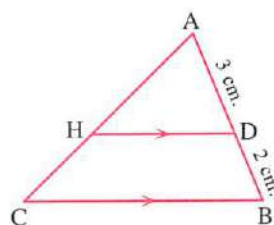
- (a) 2 (b) 3  
(c) 4 (d) 5



**(18) In the opposite figure :**

The area of ( $\Delta ADH$ )  
The area of (figure DBCH) = .....

- (a)  $\frac{3}{2}$  (b)  $\frac{9}{16}$   
(c)  $\frac{9}{25}$  (d)  $\frac{3}{5}$

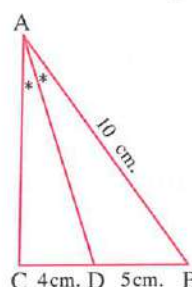


**(19) In the opposite figure :**

$\overrightarrow{AD}$  bisects  $\angle BAC$

, then AD = ..... cm.

- (a) 8 (b) 60  
(c)  $2\sqrt{15}$  (d)  $7\sqrt{3}$

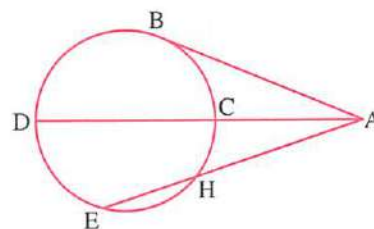


**(20) In the opposite figure :**

All of the following expressions are true

, except .....

- (a)  $(AB)^2 = AC \times AD$   
(b)  $(AB)^2 = AH \times AE$   
(c)  $AC \times AD = AH \times AE$   
(d)  $AC \times CD = AH \times HE$



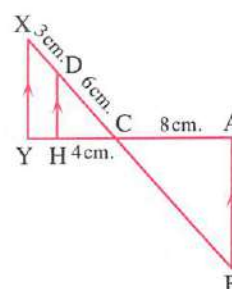
**(21) In the opposite figure :**

$\overline{AB} \parallel \overline{DH} \parallel \overline{XY}$ ,  $\overline{AY} \cap \overline{BX} = \{C\}$ , AC = 8 cm.

, CH = 4 cm. , CD = 6 cm.

, DX = 3 cm. , then BC + HY = ..... cm.

- (a) 12 (b) 15  
(c) 8 (d) 14

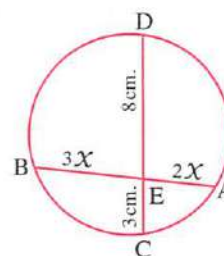


**(22) In the opposite figure :**

EC = 3 cm. , ED = 8 cm.

, then the value of  $x$  = ..... cm.

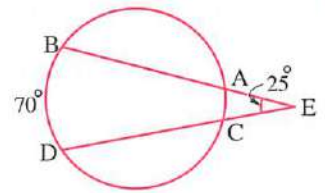
- (a) 2 (b) 4  
(c) 8 (d) 6



(23) In the opposite figure :

$$m(\widehat{AC}) = \dots\dots\dots^\circ$$

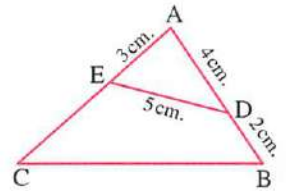
- (a) 20 (b) 30  
(c) 40 (d) 50



(24) In the opposite figure :

$\triangle ABC \sim \triangle AED$  ,  $AE = 3$  cm. ,  $AD = 4$  cm. ,  $BD = 2$  cm.  
 ,  $DE = 5$  cm. , then  $BC = \dots\dots\dots$  cm.

- (a) 2.5 (b) 10  
(c) 7.5 (d) 7



(25) Two triangles in which the first whose two angles of measure  $50^\circ$  ,  $60^\circ$  and the second whose two angles of measure  $60^\circ$  ,  $70^\circ$  , then the two triangles are .....

- (a) congruent and not similar. (b) similar.  
(c) congruent and similar. (d) not congruent and not similar.

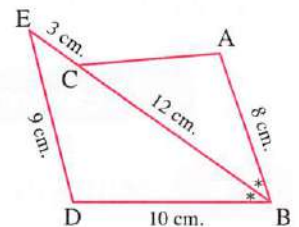
(26) If  $P_M(A) = -9$  , then this means that .....

- (a) the point A lies outside the circle whose center M.  
(b) the point A lies inside the circle whose center M.  
(c) the radius length of the circle whose center M equals 9 length unit.  
(d) the length of the tangent segment drawn from the point A to the circle whose center M equals 3 length unit.

(27) In the opposite figure :

$$AC = \dots\dots\dots \text{ cm.}$$

- (a) 6.2 (b) 6  
(c) 7.2 (d) 7

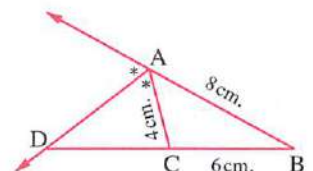


(28) In the opposite figure :

$\overrightarrow{AD}$  bisects  $\angle A$  externally

$$CD = \dots\dots\dots \text{ cm.}$$

- (a) 2 (b) 4  
(c) 6 (d) 8



## Second Essay questions

Answer the following questions :

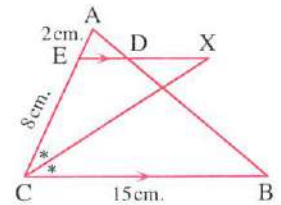
### 1 In the opposite figure :

If  $\overrightarrow{CX}$  bisects  $\angle ACB$  ,  $\overline{XE} \parallel \overline{BC}$

$AE = 2$  cm. ,  $EC = 8$  cm.

,  $BC = 15$  cm.

Find the length of  $XD$



### 2 Find the solution set of the following inequality : $x(x + 4) \leq 12$

### 3 If $\sin \theta = \frac{4}{5}$ , where $\theta$ is the greatest positive angle in $[0, 360^\circ]$ , then find : $\sin (180^\circ - \theta) + \tan (90^\circ - \theta)$

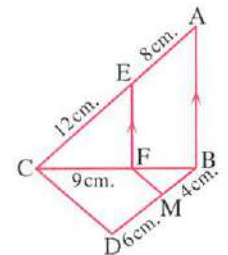
### 4 In the opposite figure :

$\overline{AB} \parallel \overline{EF}$  ,  $AE = 8$  cm. ,  $CE = 12$  cm.

$CF = 9$  cm. ,  $BM = 4$  cm. ,  $DM = 6$  cm.

, then : **( 1 ) Find :** the length of  $\overline{BF}$

**( 2 ) Prove that :**  $\overline{FM} \parallel \overline{CD}$



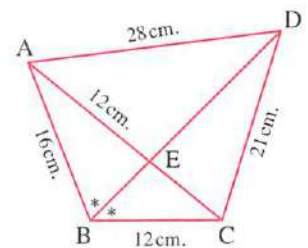
### 5 In the opposite figure :

$\overrightarrow{BE}$  bisects  $\angle ABC$

,  $BC = AE = 12$  cm.

,  $AB = 16$  cm. ,  $DC = 21$  cm. ,  $AD = 28$  cm.

Prove that :  $\overrightarrow{DE}$  bisects  $\angle ADC$



## 7 El-Kalyoubia Governorate



El-obour Educational Zone  
Manart El-Bayan Secondary Schools

## First Multiple choice questions

Choose the correct answer from the given ones :

( 1 )  $i^{37} = \dots\dots\dots$

(a)  $-1$

(b)  $1$

(c)  $-i$

(d)  $i$

( 2 ) Conjugate  $2i - 5$  is  $\dots\dots\dots$

(a)  $2i + 5$

(b)  $2i - 5$

(c)  $-2i - 5$

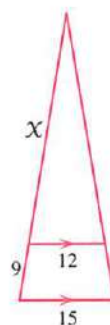
(d)  $-5 + 2i$

- (3) Form the quadratic equation with the two roots  $1 + i$ ,  $1 - i$  .....
- (a)  $x^2 + x + 2 = 0$  (b)  $x^2 + 2x + 2 = 0$  (c)  $x^2 - 2x + 2 = 0$  (d)  $x^2 + 2 = 0$
- (4) L,  $2 - L$  two roots  $x^2 - kx + 6 = 0$ , then  $k =$  .....
- (a) 6 (b) 3 (c) 5 (d) 2
- (5) L, M are the two roots of the equation :  $x^2 - 5x + 3 = 0$ , then  $L^2 + M^2 =$  .....
- (a) 9 (b) 5 (c) 19 (d) 22
- (6) If  $\tan(180^\circ + \theta) = 1$  where  $\theta$  is the smallest positive angle, then  $\theta =$  .....
- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $135^\circ$
- (7) The solution set of the equation :  $x^2 = x$  in  $\mathbb{R}$  is .....
- (a)  $\{0\}$  (b)  $\{0, 1\}$  (c)  $\{0, -1\}$  (d)  $\{1\}$
- (8)  $f(x) = 6 - 2x$  positive at  $x \in$  .....
- (a)  $x \leq 3$  (b)  $x \geq 3$  (c)  $x > 3$  (d)  $x < 3$
- (9) If L is one of the two roots of the equation :  $x^2 - 5x - 3 = 0$ , then  $L^2 - 5L + 7 =$  .....
- (a) 10 (b) 4 (c) 12 (d) -4
- (10) The arc length in a circle of radius 6 cm. opposite to central angle  $\frac{\pi}{2}$  is = ..... cm.
- (a)  $\frac{3\pi}{2}$  (b)  $2\pi$  (c)  $\frac{5}{2}\pi$  (d)  $3\pi$
- (11) If  $5 \sin \theta = 4$ ,  $90^\circ < \theta < 180^\circ$ , then  $3 \cot(90^\circ + \theta) =$  .....
- (a) 5 (b) -5 (c) 4 (d) -3
- (12) The solution set of the inequality :  $(x - 3)(x - 7) < 0$  in  $\mathbb{R}$  is .....
- (a)  $\{3, 7\}$  (b)  $]3, 7[$  (c)  $[3, 7]$  (d)  $\mathbb{R} - [3, 7]$
- (13) If  $f(x) = 4 \sin x$ ,  $x \in [0, \pi]$  the rang of function .....
- (a)  $[0, 4]$  (b)  $]0, 4[$  (c)  $] - 4, 0[$  (d)  $[-4, 4]$
- (14) If  $\sin \theta = \cos \theta$  where  $\theta$  is acute angle, then  $\tan 2\theta =$  .....
- (a) 1 (b) -1 (c) undefined. (d)  $\sqrt{3}$
- (15) Two similar polygons, ratio between their perimeters equal 4 : 9, then ratio between the lengths of two corresponding side is .....
- (a) 4 : 9 (b) 2 : 3 (c) 16 : 81 (d) 9 : 4
- (16) Two similar rectangles, the dimensions of the first are 12 cm., 8 cm. and the perimeter of the second equal = 60 cm. the area of the second = .....  $\text{cm}^2$
- (a) 100 (b) 216 (c) 500 (d) 864

(17) In the opposite figure :

$x = \dots\dots\dots$  cm.

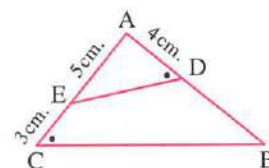
- (a) 12 (b) 24  
(c) 36 (d) 48



(18) In the opposite figure :

$BD = \dots\dots\dots$  cm.

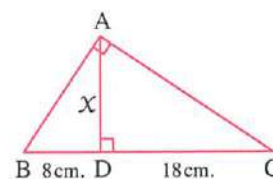
- (a) 5 (b) 6  
(c) 4 (d) 7



(19) In the opposite figure :

$x = \dots\dots\dots$  cm.

- (a)  $12\sqrt{3}$  (b) 24  
(c) 12 (d)  $8\sqrt{3}$



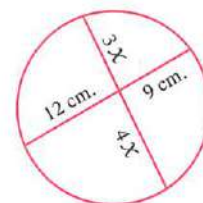
(20) If  $\triangle ABC \sim \triangle XYZ$ ,  $AB = 3 XY$ , then  $\frac{\text{area of } (\triangle XYZ)}{\text{area of } (\triangle ABC)} = \dots\dots\dots$

- (a) 3 (b)  $\frac{1}{3}$  (c)  $\frac{1}{9}$  (d) 9

(21) In the opposite figure :

$x = \dots\dots\dots$  cm.

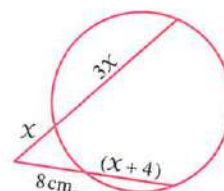
- (a) 3 (b) 9  
(c) 18 (d) 21



(22) In the opposite figure :

$x = \dots\dots\dots$  cm.

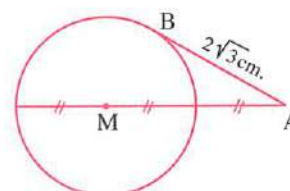
- (a) 5 (b) 6  
(c) 3 (d) 9



(23) In the opposite figure :

The length of the radius of circle M =  $\dots\dots\dots$  cm.

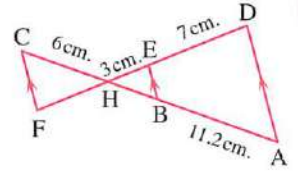
- (a) 2 (b) 4  
(c) 3 (d) 5



(24) In the opposite figure :

$\overline{AD} \parallel \overline{BE} \parallel \overline{FC}$  , then HF = ..... cm.

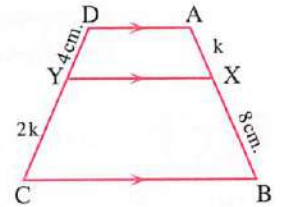
- (a) 3.6 (b) 4.8  
(c) 6.3 (d) 3.75



(25) In the opposite figure :

$\overline{AD} \parallel \overline{XY} \parallel \overline{BC}$  , then K = .....

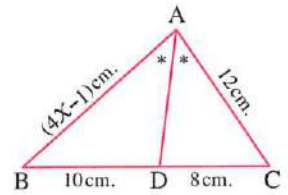
- (a)  $\frac{3}{8}$  (b) 4  
(c) 16 (d) 32



(26) In the opposite figure :

$X =$  ..... cm.

- (a) 3 (b) 4  
(c) 4.5 (d) 6



(27) If M is a circle of radius length 3 cm. , A is a point lies in its plane where MA = 4 cm.

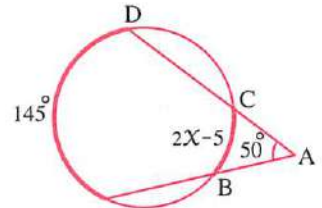
, then  $P_M(A) =$  .....

- (a)  $\sqrt{7}$  (b) 9 (c) 7 (d) -7

(28) In the opposite figure :

$X =$  .....

- (a)  $50^\circ$  (b)  $25^\circ$   
(c)  $100^\circ$  (d)  $75^\circ$



## Second Essay questions

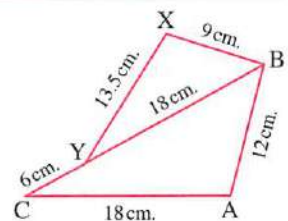
Answer the following questions :

- Investigate the sign of the function  $f(x) = 4 - x^2$  and determine the solution  $4 - x^2 \leq 0$
- Find the general solution of the equation :  $\cos 2\theta = \sin 4\theta$
- If  $L + 1$  ,  $M + 1$  are two roots of the equation :  $x^2 - 7x + 5 = 0$  , then form the equation whose two roots  $L^2$  ,  $M^2$

4 In the opposite figure :

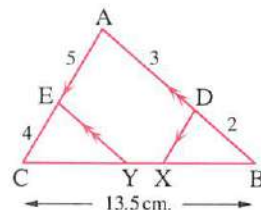
B , Y and C are collinear prove that

$\Delta XBY \sim \Delta ABC$



**5 In the opposite figure :**

The length of  $\overline{XY} = \dots\dots\dots$



**8 El-Monoufia Governorate**



Quesna Educational directorate  
Mathematics Supervision

**First Multiple choice questions**

**Choose the correct answer from the given ones :**

( 1 ) The sign of the function  $f : f(x) = 6 - 2x$  is non-positive when .....

- (a)  $x > 3$  (b)  $x \leq 3$  (c)  $x < 3$  (d)  $x \geq 3$

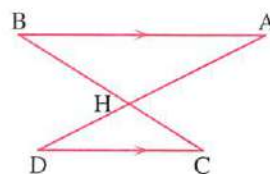
( 2 ) In the opposite figure :

$\overline{AB} \parallel \overline{DC}$  ,  $2AH = 3HD$

,  $BH - CH = 4$  cm.

, then  $BC = \dots\dots\dots$  cm.

- (a) 18 (b) 20 (c) 24 (d) 25

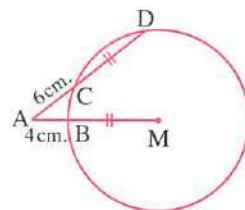


( 3 ) In the opposite figure :

$CD = BM$  , then the circumference

of the circle M = .....

- (a)  $15\pi$  (b)  $18\pi$   
(c)  $20\pi$  (d)  $24\pi$



( 4 ) If ABC is a right-angled triangle at B ,  $\sin A + \cos C = 1$  , then  $\tan C = \dots\dots\dots$

- (a) 1 (b) -1 (c)  $\frac{1}{\sqrt{3}}$  (d)  $\sqrt{3}$

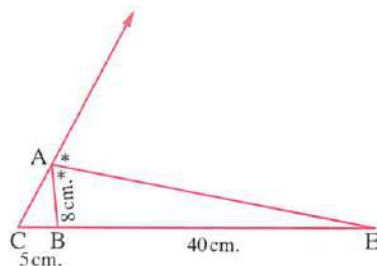
( 5 ) The solution set of the equation :  $x^2 + 9 = 0$  in the set of complex numbers is .....

- (a)  $\{3, -3\}$  (b)  $\{-3i\}$  (c)  $\{3i, -3i\}$  (d)  $\emptyset$

( 6 ) In the opposite figure :

$AE = \dots\dots\dots$  cm.

- (a) 32 (b) 45  
(c) 48 (d)  $24\sqrt{3}$



(7) If  $\sin X = \cos y$ , then  $\sin (X + y) = \dots\dots\dots$

- (a) 1 (b) zero (c) -1 (d) otherwise.

(8) If one of the two roots of the equation :  $4kX^2 + 7X + k^2 + 4 = 0$  is the multiplicative inverse of the other root, then  $k = \dots\dots\dots$

- (a)  $\pm 2$  (b) 3 (c) 4 (d) 2

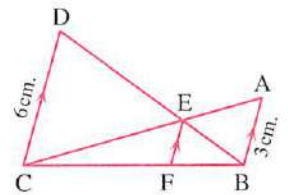
(9) If  $\Delta ABC \sim \Delta XYZ$  and  $3AB = 2XY$ , then area of  $\Delta ABC$  : area of  $\Delta XYZ = \dots\dots\dots$

- (a) 4 : 9 (b) 9 : 4 (c) 2 : 3 (d) 3 : 2

(10) In the opposite figure :

If  $\overline{AB} \parallel \overline{EF} \parallel \overline{CD}$ , then  $EF = \dots\dots\dots$  cm.

- (a) 2.5 (b) 2  
(c) 1.5 (d) 1



(11)  $(1 - i)^{12} = \dots\dots\dots$

- (a)  $-64i$  (b)  $64i$  (c)  $-64$  (d)  $64$

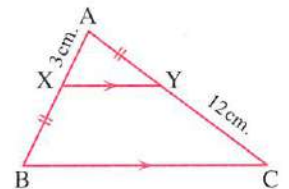
(12) The function  $f : f(\theta) = \sin(b\theta)$  is a periodic function and its period  $\left(\frac{2\pi}{3}\right)$ , then  $b = \dots\dots\dots$

- (a)  $\frac{3}{4}$  (b)  $\frac{5}{3}$  (c) 3 (d) 6

(13) In the opposite figure :

If  $\overline{XY} \parallel \overline{BC}$ , then  $AC = \dots\dots\dots$  cm.

- (a) 15 (b) 16  
(c) 18 (d) 20

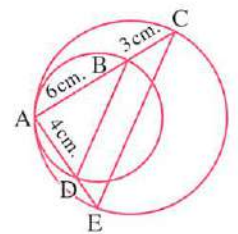


(14) In the opposite figure :

$AB = 6$  cm. ,  $BC = 3$  cm. ,  $AD = 4$  cm.

the two circles touching internally at A, then  $ED = \dots\dots\dots$  cm.

- (a) 2 (b) 3  
(c) 3.5 (d) 4



(15) If  $(2 + 3i) + (1 - i) = X + yi$ , then  $X + y = \dots\dots\dots$

- (a) 2 (b) -4 (c) 5 (d) 7

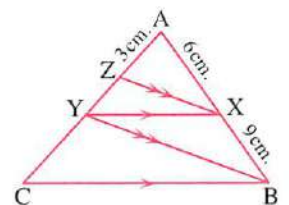
(16) In the opposite figure :

$\overline{XY} \parallel \overline{BC}$ ,  $\overline{XZ} \parallel \overline{BY}$

,  $AX = 6$  cm. ,  $XB = 9$  cm. ,  $AZ = 3$  cm.

, then the length of  $\overline{ZC} = \dots\dots\dots$  cm.

- (a) 4.5 (b)  $15\frac{3}{4}$  (c) 36 (d) 45



- (17) If  $S_1$  is the solution set of the inequality :  $x^2 - x - 2 \leq 0$  and  $S_2$  is the solution set of the inequality :  $x^2 + x - 2 \leq 0$  , then  $S_1 \cap S_2 = \dots\dots\dots$

(a)  $\emptyset$  (b)  $[-2, 2]$  (c)  $[-1, 1]$  (d)  $\mathbb{R} - ]-1, 1[$

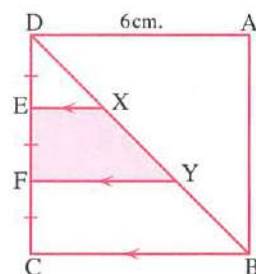
- (18) In the opposite figure :

ABCD is a square of side length 6 cm.

,  $DE = EF = FC$

, then the area of the polygon XYFE = .....  $\text{cm}^2$

(a) 6 (b) 8  
(c) 10 (d) 12



- (19) The terminal side of angle  $\theta$  in standard position intersects the unit circle at point

$B\left(x, \frac{3}{5}\right)$  where  $x < 0$  , then  $\sin(90^\circ + \theta) = \dots\dots\dots$

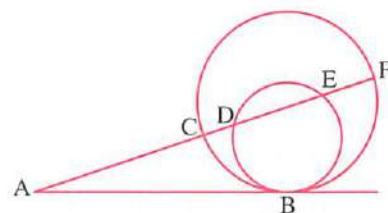
(a) -0.8 (b) -0.6 (c) 0.8 (d) 0.6

- (20) If  $\overrightarrow{AB}$  is a common tangent to two

circles touching internally at B

, then  $AC : AD = \dots\dots\dots$

(a)  $AB : AF$  (b)  $3 : 4$   
(c)  $AD : AF$  (d)  $AE : AF$



- (21) In the opposite figure :

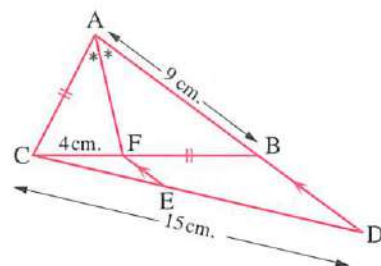
ABC is a triangle ,  $\overrightarrow{AF}$  bisects  $\angle A$  internally

,  $AC = BF$  ,  $\overrightarrow{FE} \parallel \overrightarrow{BD}$

,  $CD = 15$  cm.

,  $CF = 4$  cm. ,  $AB = 9$  cm. , then  $DE = \dots\dots\dots$  cm.

(a) 4 (b) 6 (c) 9 (d) 11



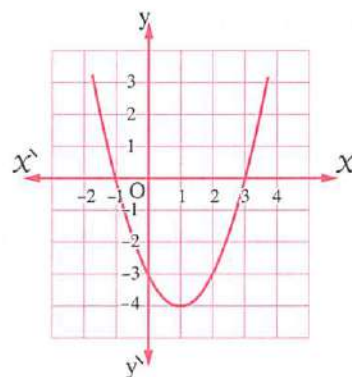
- (22) In the opposite figure :

The curve of the function  $f : f(x) = x^2 - 2x - 3$

, then the solution set of the inequality :

$x^2 - 2x - 3 \geq 0$  in  $\mathbb{R}$  is .....

(a)  $]-1, 3[$  (b)  $\mathbb{R} - [-1, 3]$   
(c)  $]3, \infty[$  (d)  $]-\infty, -1] \cup [3, \infty[$



- (23) The dimensions of a rectangle are 10 cm. , 6 cm. , if the scale factor equals 3 , then the perimeter of another of rectangle similar to it = ..... cm.

(a) 96 (b) 69 (c) 15 (d) 30

- (24) In the opposite figure :

$$\theta^{\text{rad}} \approx \dots\dots\dots$$

(a)  $1.5^{\text{rad}}$  (b)  $1.012^{\text{rad}}$   
(c)  $2^{\text{rad}}$  (d) 4

- (25) In the opposite figure :

If EB = 6 cm. , CD = 8 cm.

, AC = 10 cm

, AE = 2 cm. , BD = 4 cm.

, then ED = .....

(a) 2 (b) 4 (c) 3 (d) 5

- (26) If M is a circle with diameter length 12 cm. , A is a point in its plane and the power of the point A with respect to the circle M equals 13 cm. , then MA = ..... cm.

(a) 7 (b) 14 (c) 3.5 (d) 6

- (27) In the opposite figure :

If the area of  $\triangle DEF = 6 \text{ cm}^2$

, then the area of shaded part = .....  $\text{cm}^2$

(a) 27 (b) 36  
(c) 48 (d) 54

- (28) The range of the function  $f : f(\theta) = 3 \sin 2\theta$  is .....

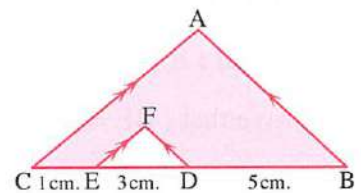
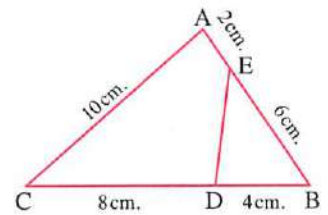
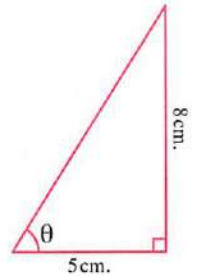
(a)  $[-2, 2]$  (b)  $]-2, 2[$  (c)  $[-3, 3]$  (d)  $]-3, 3[$

## Second Essay questions

Answer the following questions :

- 1 If  $\cos X = \frac{3}{5}$  ,  $270^\circ < X < 360^\circ$  Find the value of :

$$\sin(180^\circ - X) + \tan(90^\circ - X) + \tan(270^\circ - X)$$

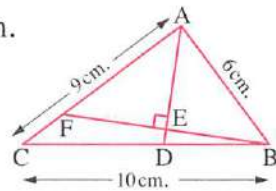


**2 In the opposite figure :**

ABC is a triangle in which  $AB = 6$  cm. ,  $AC = 9$  cm. and  $BC = 10$  cm.

,  $D \in \overline{BC}$  where  $BD = 4$  cm. ,  $\overline{BE} \perp \overline{AD}$

and intersects  $\overline{AD}$  and  $\overline{AC}$  at E and F respectively.



**( 1 ) Prove that :**  $\overline{AD}$  bisect  $\angle A$

**( 2 ) Find :** area of  $\triangle ABF$  : area of  $\triangle CBF$

**3 Find in  $\mathbb{R}$  the solution set of the inequality :  $(X + 3)^2 < 10 - 3(X + 3)$**

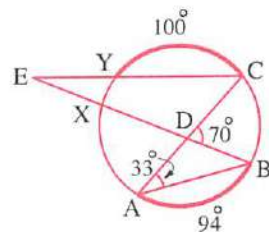
**4 In the opposite figure :**

$m(\angle BAC) = 33^\circ$  ,  $m(\angle BDC) = 70^\circ$

,  $m(\widehat{AB}) = 94^\circ$

,  $m(\widehat{CY}) = 100^\circ$

**Find :**  $m(\angle BEC)$



**5 ABC is a triangle , M is the midpoint of  $\overline{BC}$  , let  $K \in \overline{AM}$**

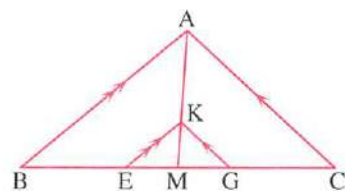
, draw  $\overline{KE} \parallel \overline{AB}$  to intersect  $\overline{BC}$  at E , draw  $\overline{KG} \parallel \overline{AC}$

to intersect  $\overline{BC}$  at G.

**First :** Prove that : M is the midpoint of  $\overline{EG}$ .

**Second :** If K is the point of intersection of the medians of  $\triangle ABC$

Prove that :  $BE = EG = GC = \frac{1}{3} BC$



**9**

**El-Gharbia Governorate**



**Central Mathematics Supervision  
Official Language Schools**

**First Multiple choice questions**

**Choose the correct answer from the given ones :**

**( 1 )** If  $\tan(180^\circ + \theta) = 1$  where  $\theta$  is the smallest positive angle , then  $\theta = \dots\dots\dots$

- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $135^\circ$

**( 2 )** If L , - L are the two roots of the equation :  $X^2 - (k - 7) X - 25 = 0$

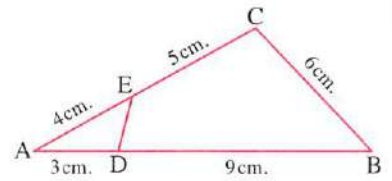
, then k =  $\dots\dots\dots$

- (a) 3 (b) 5 (c) 7 (d) 9

(3) In the opposite figure :

ED = ..... cm.

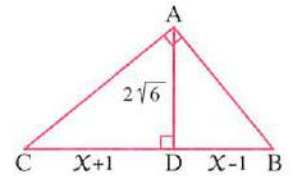
- (a) 2 (b) 3  
(c) 4 (d) 5



(4) In the opposite figure :

AD =  $2\sqrt{6}$  cm. , then the value of  $x =$  .....

- (a) 3 (b) 4  
(c) 5 (d) 6



(5)  $i^{-24} =$  .....

- (a) 1 (b) -1 (c) i (d) -i

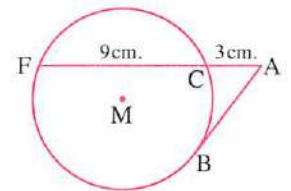
(6) If the function  $y = \sin\left(\frac{\pi}{2} + x\right)$  has the maximum value at  $x =$  .....

- (a)  $\frac{\pi}{2}$  (b)  $\frac{\pi}{4}$  (c)  $\pi$  (d) zero

(7) In the opposite figure :

AC = 3 cm. , CF = 9 cm. ,  $\overline{AB}$  touches the circle M at B , then  $P_M(A) =$  .....

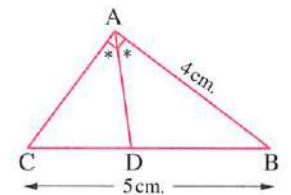
- (a) 6 (b) 9  
(c) 27 (d) 36



(8) In the opposite figure :

BC = 5 cm. , AB = 4 cm. ,  $\overline{AB} \perp \overline{AC}$  , then  $\frac{BD}{DC} =$  .....

- (a)  $\frac{4}{5}$  (b)  $\frac{3}{5}$   
(c)  $\frac{3}{4}$  (d)  $\frac{4}{3}$



(9) The solution set of the equation :  $x^2 + 9 = 0$  in the set of complex number is .....

- (a)  $\{3, -3\}$  (b)  $\{-3i\}$  (c)  $\{3i, -3i\}$  (d)  $\emptyset$

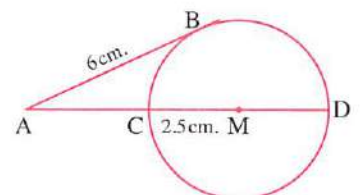
(10) The degree measure of the angle whose measure  $\frac{7\pi}{6} =$  .....

- (a)  $105^\circ$  (b)  $210^\circ$  (c)  $420^\circ$  (d)  $840^\circ$

(11) In the opposite figure :

$\overline{AB}$  is a tangent segment to circle M , AB = 6 cm. , CM = 2.5 cm. , then AC = ..... cm.

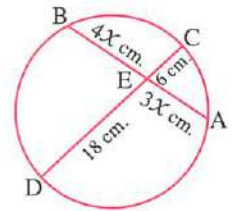
- (a) 9 (b) 4 (c) 2.5 (d) 5



**(12) In the opposite figure :**

$x = \dots\dots\dots$  cm.

- (a) 3 (b) 9  
(c) 2 (d) 18



**(13) The two roots of the equation :  $kx^2 - 12x + 9 = 0$  are equal if .....**

- (a)  $k > 4$  (b)  $k < 4$  (c)  $k = 4$  (d)  $k = 9$

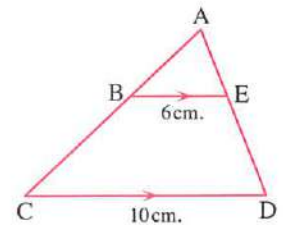
**(14) The angle with measure  $585^\circ$  in standard position is equivalent to the angle with measure .....**

- (a)  $\frac{\pi}{4}$  (b)  $\frac{5\pi}{4}$  (c)  $\frac{3\pi}{4}$  (d)  $\frac{7\pi}{4}$

**(15) In the opposite figure :**

If  $\overline{BC} \parallel \overline{DE}$ , then  $\frac{\text{area of } \triangle ABE}{\text{area of trapezium BCDE}} = \dots\dots\dots$

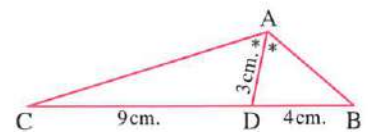
- (a)  $\frac{25}{81}$  (b)  $\frac{3}{5}$   
(c)  $\frac{9}{16}$  (d)  $\frac{9}{25}$



**(16) In the opposite figure :**

$AB \times AC = \dots\dots\dots \text{ cm}^2$

- (a) 36 (b) 45  
(c) 12 (d) 27



**(17) If  $\tan(4\theta) = \cot(5\theta)$ , then  $\sin(3\theta) = \dots\dots\dots$  where  $3\theta$  is the measure of acute angle.**

- (a)  $\frac{1}{2}$  (b) 1 (c) -1 (d)  $\frac{\sqrt{3}}{2}$

**(18) If  $(2 + 3i) + (1 - i) = x + yi$ , then  $x + y = \dots\dots\dots$**

- (a) 2 (b) -4 (c) 5 (d) 6

**(19) All .....** are similar.

- (a) triangles (b) rectangle (c) parallelograms (d) squares

**(20) The length of an arc opposite to a central angle of measure  $150^\circ$  in a circle with radius length 8 cm. equals .....**

- (a)  $\frac{20}{3}\pi$  (b)  $\frac{17}{2}\pi$  (c)  $8\pi$  (d) 20

**(21) The quadratic equation whose roots  $\frac{3}{i}$ ,  $\frac{3+3i}{1-i}$  is .....**

- (a)  $x^2 - 3x + 9 = 0$  (b)  $x^2 + 9 = 0$  (c)  $x^2 + 9x + 9 = 0$  (d)  $x^2 = 9$

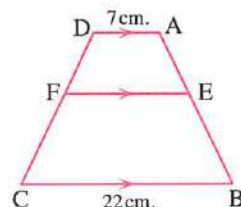
**(22) If the degree measure of an angle is  $64^\circ 48'$ , then its radian measure is .....**

- (a)  $0.18^{\text{rad}}$  (b)  $0.36^{\text{rad}}$  (c)  $11.3^{\text{rad}}$  (d)  $\frac{9}{25}\pi$

**(23) In the opposite figure :**

If  $\frac{AE}{EB} = \frac{2}{3}$ , then FE = ..... cm.

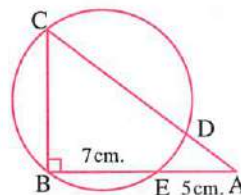
- (a) 9 (b) 11  
(c) 13 (d) 15

**(24) In the opposite figure :**

BC = 9 cm.

, then DC = ..... cm.

- (a) 9 (b) 10  
(c) 11 (d) 12

**(25) The sign of the function  $f : f(x) = 7 - x$  is negative in the interval .....**

- (a)  $]-\infty, 7[$  (b)  $]-\infty, \infty[$  (c)  $]7, \infty[$  (d)  $]-7, 7[$

**(26) If  $\sin \theta = -\frac{1}{2}$ ,  $\cos \theta = \frac{\sqrt{3}}{2}$ , then  $\theta =$  .....**

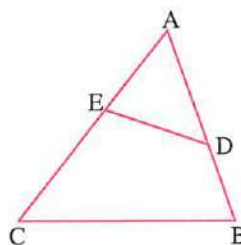
- (a)  $30^\circ$  (b)  $150^\circ$  (c)  $210^\circ$  (d)  $330^\circ$

**(27) In the opposite figure :**

$\Delta ABC \sim \Delta AED$  if AD = 3 cm. , BD = 2 cm.

, AE = 2.5 cm. , then EC = ..... cm.

- (a) 2.5 (b) 3  
(c) 4.5 (d) 3.5

**(28)  $(1 - i)^{12} =$  .....**

- (a)  $-64i$  (b)  $64i$  (c)  $-64$  (d)  $64$

## Second Essay questions

Answer the following questions :

**1** Find the solution set of the inequality :  $x^2 - 5x + 6 \leq 0$  in  $\mathbb{R}$

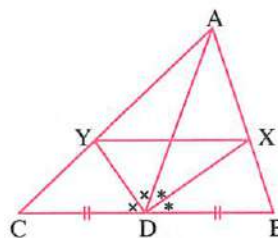
**2 In the opposite figure :**

$\overline{AD}$  is the median of  $\Delta ABC$

,  $\overline{DX}$  bisects  $\angle ADB$

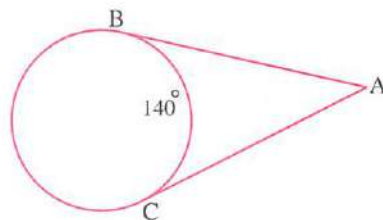
,  $\overline{DY}$  bisects  $\angle ADC$

Prove that :  $\overline{XY} \parallel \overline{BC}$



**3** Prove that :  $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ = \sin^2 \frac{\pi}{4}$

- 4  $\overline{AB}$ ,  $\overline{AC}$  are two tangents to the circle  $m(\widehat{BC}) = 140^\circ$ , find  $m(\angle A)$

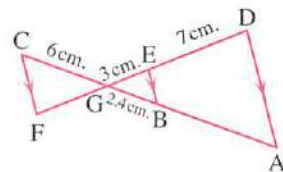


- 5 In the opposite figure :

$\overline{AD} \parallel \overline{BE} \parallel \overline{FC}$  and  $\overleftrightarrow{AC}$ ,  $\overleftrightarrow{DF}$

are two transversal intersect at G

Find the length of each of  $\overline{GF}$ ,  $\overline{GA}$



10

El-Fayoum Governorate



Directorate of Education

First

Multiple choice questions

Choose the correct answer from the given ones :

- (1) The conjugate of the number  $(3i - 4)$  is .....

(a)  $3i + 4$  (b)  $-3i - 4$  (c)  $-3i + 4$  (d)  $3i - 4$

- (2) The two roots of the equation :  $x^2 - 5x + 11 = 0$  are .....

(a) two complex and non-real roots. (b) two rational roots.  
(c) two different real roots. (d) two equal real roots.

- (3) The sum of the two roots of the equation :  $4x^2 + 4x - 35 = 0$  is .....

(a)  $-1$  (b)  $-4$  (c)  $1$  (d)  $-\frac{35}{4}$

- (4) If L and M are the two roots of the equation :  $x^2 - 4x + 1 = 0$

, then the value of  $L^2 - 4L + 1 =$  .....

(a) 0 (b)  $-4$  (c) 1 (d)  $-1$

- (5) The sign of the function  $f : f(x) = 6 - 2x$  is positive at .....

(a)  $x > 3$  (b)  $x \leq 3$  (c)  $x < 3$  (d)  $x \geq 3$

- (6) If one of the two roots of the equation :  $x^2 - (b - 3)x + 5 = 0$  is the additive inverse of the other root , then  $b =$  .....

(a)  $-5$  (b)  $-3$  (c) 3 (d) 5

- (7)  $\sqrt{-16} =$  .....

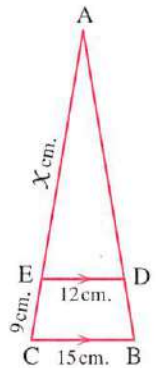
(a)  $-4$  (b) 4 (c)  $2i$  (d)  $4i$

- (8) The angle of measure  $1670^\circ$  lies in the ..... quadrant.  
 (a) first. (b) second. (c) third. (d) fourth.
- (9) In a circle of diameter length 12 cm. , the length of the arc subtended by a central angle of measure  $60^\circ$  equals ..... cm.  
 (a)  $5\pi$  (b)  $4\pi$  (c)  $3\pi$  (d)  $2\pi$
- (10) If  $\csc \theta = 2$  , where  $\theta$  is a positive acute angle , then the measure of angle  $\theta =$  .....  
 (a)  $15^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $60^\circ$
- (11) The simplest form of the expression :  $\tan (90^\circ - \theta) + \tan (90^\circ + \theta)$  is .....  
 (a)  $2 \cot \theta$  (b)  $2 \tan \theta$  (c) zero (d)  $\tan \theta + \cot \theta$
- (12) The range of the function  $f : f(x) = \cos 5\theta$  is .....  
 (a)  $\{5, -5\}$  (b)  $[-1, 1]$  (c)  $]-5, 5[$  (d)  $[-5, 5]$
- (13) If  $K$  is the scale factor of similarity of polygon  $M_1$  to polygon  $M_2$  and  $0 < K < 1$  , then the polygon  $M_1$  is ..... to polygon  $M_2$   
 (a) congruent to (b) enlargement  
 (c) minimization (d) of double area

(14) In the opposite figure :

$x =$  ..... cm.

- (a) 12  
 (b) 24  
 (c) 36  
 (d) 48

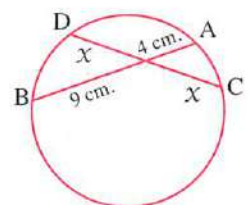


- (15) The ratio between the perimeters of two similar polygons is  $4 : 9$  , so the ratio between their areas is .....  
 (a)  $4 : 9$  (b)  $9 : 4$  (c)  $2 : 3$  (d)  $16 : 81$

(16) In the opposite figure :

$x =$  .....

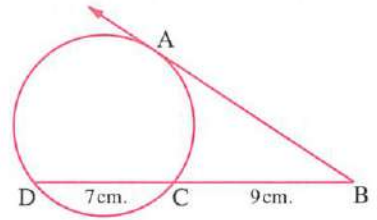
- (a) 6 (b)  $-6$   
 (c)  $\pm 6$  (d) 36



(17) In the opposite figure :

AB = ..... cm.

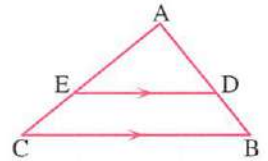
- (a) 63 (b) 144  
(c) 12 (d)  $\frac{9}{16}$



(18) In the opposite figure :

If  $\frac{AD}{DB} = \frac{5}{3}$ , then  $\frac{AB}{BD} =$  .....

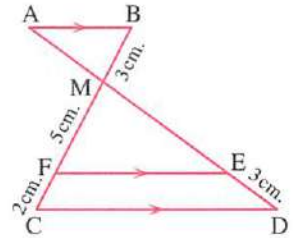
- (a)  $\frac{3}{5}$  (b)  $\frac{8}{3}$   
(c)  $\frac{3}{8}$  (d)  $\frac{5}{8}$



(19) In the opposite figure :

AE = ..... cm.

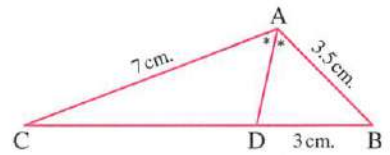
- (a) 6 (b) 7.5  
(c) 10 (d) 12



(20) In the opposite figure :

CD = ..... cm.

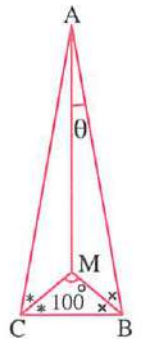
- (a) 4.5 (b) 5  
(c) 4.9 (d) 6



(21) In the opposite figure :

$\theta =$  .....

- (a)  $10^\circ$   
(b)  $20^\circ$   
(c)  $40^\circ$   
(d)  $80^\circ$



(22) If M is a circle of radius length 3 cm. , A is a point lies in its plane where

MA = 4 cm. , then  $P_M(A) =$  .....

- (a)  $\sqrt{7}$  (b) 9 (c) 7 (d) - 7

(23) The product of the two roots of the equation :  $3x^2 - 4 = 0$  multiplying by the sum of the two roots of the equation :  $x^2 - 3x = 0$  is .....

- (a) 12 (b) - 3 (c) - 4 (d) 3

(24) The function  $f : f(x) = -3$  is negative in the interval .....

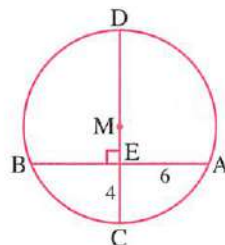
- (a)  $]-\infty, 3[$  only. (b)  $]-3, 3[$  only.  
(c)  $]-\infty, \infty[$  (d)  $]-2, 2[$  only.

(25) In the opposite figure :

The radius length

of the circle = ..... cm.

- (a) 9 (b) 4.5  
(c) 6 (d) 6.5



(26) Two similar polygons, the ratio between their perimeters equal  $4 : 9$ , then the ratio between the lengths of two corresponding sides is .....

- (a)  $4 : 9$  (b)  $2 : 3$  (c)  $16 : 81$  (d)  $9 : 4$

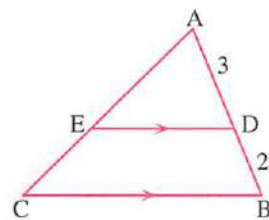
(27) If  $\triangle ABC \sim \triangle DEF$ ,  $BC = 3 EF$ , then the scale factor of similarity of the two triangle = .....

- (a)  $\frac{2}{3}$  (b)  $\frac{1}{2}$  (c) 1 (d) 3

(28) In the opposite figure :

If  $\overline{DE} \parallel \overline{BC}$ , then  $\frac{\text{The area of } (\triangle ADE)}{\text{The area of } (\triangle ABC)} = \dots\dots\dots$

- (a)  $\frac{3}{2}$  (b)  $\frac{9}{4}$   
(c)  $\frac{9}{25}$  (d)  $\frac{3}{5}$



## Second Essay questions

Answer the following questions :

1 Find in  $\mathbb{R}$  the solution set of the inequality :  $x(x+2) - 3 \leq 0$

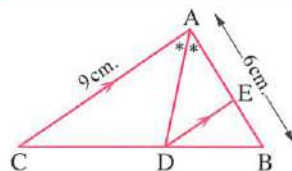
2 Find the value of :  $\cos 90^\circ \csc 30^\circ + \sec^2 45^\circ \sin 30^\circ - \cos 270^\circ \sin 180^\circ$

3 In the opposite figure :

$\overline{AD}$  bisect  $\angle BAC$ ,  $\overline{ED} \parallel \overline{AC}$

Prove that :  $\frac{BE}{EA} = \frac{BA}{AC}$

and if  $AC = 9$  cm.,  $AB = 6$  cm. find the length of each of :  $\overline{AE}$  and  $\overline{BE}$



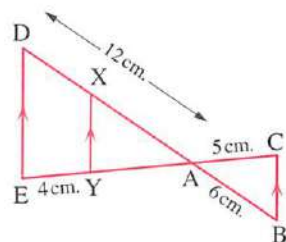
**4 In the opposite figure :**

$\overline{CE} \cap \overline{BD} = \{A\}$ ,  $X \in \overline{AD}$ ,  $Y \in \overline{AE}$ , where

$\overline{XY} \parallel \overline{BC} \parallel \overline{ED}$ , if  $AB = 6$  cm. ,  $AC = 5$  cm.

,  $AD = 12$  cm. and  $EY = 4$  cm.

**Find the length of each of :  $\overline{AE}$  and  $\overline{DX}$**



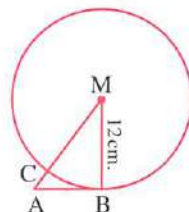
**5 In the opposite figure :**

$\overline{AB}$  is a tangent to the circle M at B ,  $\overline{MA}$  intersects the circle M at C

If the radius length of the circle equals 12 cm. ,  $P_M(A) = 81$

**, then find : ( 1 ) The length of  $\overline{AB}$**

**( 2 ) The length of  $\overline{AC}$**



## Model

1

Interactive test 1



### First Multiple choice questions

Choose the correct answer from the given ones :

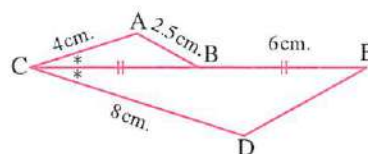
1 If  $\tan (180^\circ + \theta) = 1$  where  $\theta$  is the smallest positive angle , then  $\theta = \dots\dots\dots$

- (a)  $60^\circ$  (b)  $30^\circ$  (c)  $45^\circ$  (d)  $135^\circ$

2 In the opposite figure :

If B is the midpoint of  $\overline{CE}$  , then  $DE = \dots\dots\dots$  cm.

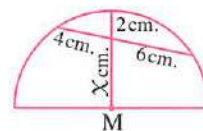
- (a) 4 (b) 5  
(c) 6 (d) 7



3 In the opposite figure :

M is the centre of semi-circle  
, then  $X = \dots\dots\dots$

- (a) 5 (b) 7 (c) 8 (d) 12



4 The solution set of the inequality  $(X - 3)(X - 7) < 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{3, 7\}$  (b)  $]3, 7[$  (c)  $[3, 7]$  (d)  $\mathbb{R} - [2, 5]$

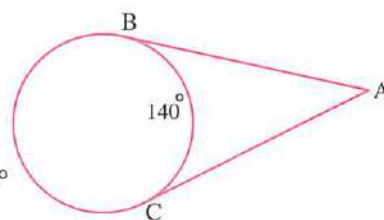
5 The exterior bisector at the vertex of an isosceles triangle  $\dots\dots\dots$  to the base.

- (a) parallel (b) perpendicular (c) bisects (d) equal

6 In the opposite figure :

$\overline{AB}$  ,  $\overline{AC}$  are two tangents to the circle  
 $m(\widehat{BC}) = 140^\circ$  , then  $m(\angle A) = \dots\dots\dots$

- (a)  $30^\circ$  (b)  $40^\circ$   
(c)  $60^\circ$  (d)  $80^\circ$



7 The roots of the equation :  $kX^2 - 12X + 9 = 0$  are equal if  $\dots\dots\dots$

- (a)  $k > 4$  (b)  $k < 4$  (c)  $k = 4$  (d)  $k = 9$

**8 In the opposite figure :**

If  $x^2 - y^2 = 16$

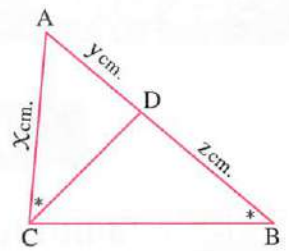
, then  $yz = \dots\dots\dots$

(a) 4

(b) 8

(c) 12

(d) 16



**9 The simplest form of the imaginary number  $i^{42}$  is .....**

(a) 1

(b) -1

(c) i

(d) -i

**10 In the opposite figure :**

The diameter of circle M is 12 cm. ,  $MC = CB$  and  $AC = (BC + 1)$  cm.

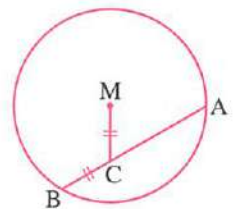
, then  $AB = \dots\dots\dots$  cm.

(a) 4

(b) 6

(c) 8

(d) 9



**11 The degree measure of the angle whose measure  $\frac{7\pi}{6}$  equals .....**

(a)  $105^\circ$

(b)  $210^\circ$

(c)  $420^\circ$

(d)  $840^\circ$

**12 ABC is a right-angled triangle at A ,  $\overline{AD} \perp \overline{BC}$  where  $D \in \overline{BC}$  , then  $(AB)^2 = \dots\dots\dots$**

(a)  $BD \times BC$

(b)  $BD \times DC$

(c)  $CD \times CB$

(d)  $AB \times AC$

**13 In the opposite figure :**

$\overline{AC}$  touches the circle M at C ,  $MC = 6$  cm.

,  $P_M(A) = 64$

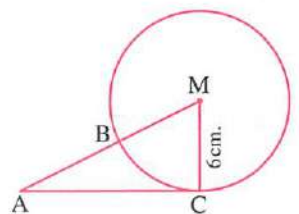
, then  $AB = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 5

(d) 6



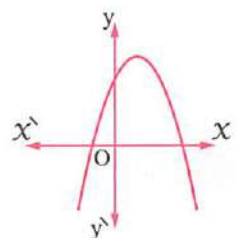
**14 The opposite figure represents the curve  $y = ax^2 + bx + c$  which of the following is true ?**

(a)  $a > 0$  ,  $c > 0$

(b)  $a > 0$  ,  $c < 0$

(c)  $a < 0$  ,  $c > 0$

(d)  $a < 0$  ,  $c < 0$

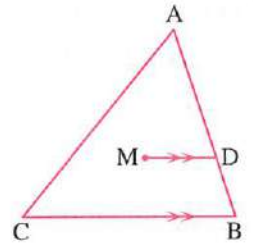


**15 In the opposite figure :**

If M is the point of concurrence of medians of  $\triangle ABC$ , and  $\overline{DM} \parallel \overline{BC}$ , then  $\frac{DM}{BC} = \dots\dots\dots$

(a)  $\frac{1}{2}$   
(c)  $\frac{2}{3}$

(b)  $\frac{1}{3}$   
(d)  $\frac{1}{4}$

**16** If A and B are the measures of two equivalent angles which of the following represents two equivalent angles also where  $C \in \mathbb{Z}$  ?

(a)  $(A + C)$ ,  $(B + C)$

(b)  $(A - C)$ ,  $(B - C)$

(c)  $(CA)$ ,  $(CB)$

(d) All the previous.

**17** If the curve  $y = x(a - x)$ , which of the following statements is true ?

[1] The curve intersects  $x$ -axis at  $(0, 0)$ ,  $(a, 0)$

[2] The vertex of the curve is  $(\frac{a}{2}, \frac{a^2}{4})$

[3] The axis of symmetry of the curve is  $x = a$

(a) [1], [2] only

(b) [1], [3] only

(c) [2], [3] only

(d) [1], [2] and [3]

**18 In the opposite figure :**

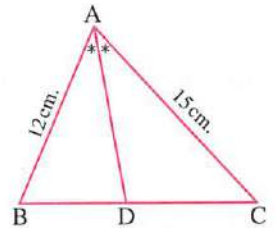
If area of  $\triangle ABC = 72 \text{ cm}^2$ ,  
then area of  $\triangle ADB = \dots\dots\dots \text{ cm}^2$

(a) 24

(b) 28

(c) 32

(d) 40

**19** If L, M are the two roots of the equation :  $x^2 - 5x + 6 = 0$ , then the quadratic equation whose roots are  $L + 1$ ,  $M + 1$  is .....

(a)  $x^2 - 7x + 8 = 0$

(b)  $(x + 1)^2 - 5(x + 1) + 6 = 0$

(c)  $x^2 - 7x + 12 = 0$

(d)  $x^2 + 7x - 10 = 0$

**20 In the opposite figure :**

$\overline{DE} \parallel \overline{BC}$ ,  $\overline{DC} \parallel \overline{BF}$

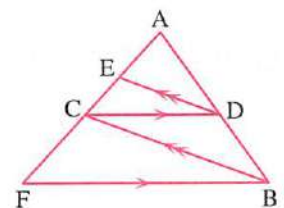
, then  $AE \times AF = \dots\dots\dots$

(a)  $(AC)^2$

(b)  $AD \times AB$

(c)  $AE \times AC$

(d)  $AC \times AB$



- 21** ABC is right-angled triangle at B, draw  $\overline{AD}$  to bisect  $\angle A$  and intersects  $\overline{BC}$  at D, if the length of  $\overline{BD} = 24$  cm.,  $BA : AC = 3 : 5$ , then the perimeter of  $\Delta ABC = \dots\dots\dots$  cm.

(a) 177 (b) 192 (c) 213 (d) 184

- 22** If the ratio between the perimeters of two similar polygons is  $4 : 9$ , then the ratio between their areas  $\dots\dots\dots$

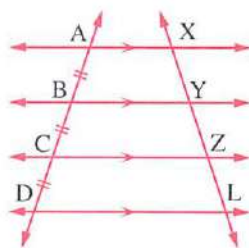
(a)  $2 : 3$  (b)  $4 : 13$  (c)  $16 : 81$  (d)  $4 : 9$

- 23** In the opposite figure :

$\overrightarrow{XA} \parallel \overrightarrow{YB} \parallel \overrightarrow{ZC} \parallel \overrightarrow{LD}$ ,  $\overrightarrow{XL}$ ,  $\overrightarrow{AD}$  are two transversals

, if  $XZ = 7$  cm.

, then  $XL = \dots\dots\dots$  cm.



(a) 7 (b) 10  
(c) 3.5 (d) 10.5

- 24** The solution set of the inequality  $x(x-1) > 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

(a)  $\{0, 1\}$  (b)  $]0, 1[$  (c)  $[0, 1]$  (d)  $\mathbb{R} - [0, 1]$

- 25** The minimum value of the function  $f : f(\theta) = 5 \cos 7\theta$  is  $\dots\dots\dots$

(a) 5 (b) zero (c) -5 (d) -7

- 26** If  $\sin \theta = -\frac{1}{2}$ ,  $\tan \theta > 0$ , then  $\theta = \dots\dots\dots$

(a)  $30^\circ$  (b)  $150^\circ$  (c)  $210^\circ$  (d)  $330^\circ$

- 27** If  $f : f(x) = ax^2 + bx + c$  is positive for all real values of  $x$ , then  $\dots\dots\dots$

(a)  $b^2 - 4ac < 0$  (b)  $b^2 - 4ac > 0$   
(c)  $b^2 - 4ac = 0$  (d)  $b^2 - 4ac \leq 0$

- 28** If one of the two roots of the equation :  $ax^2 - 3x + 2 = 0$  is the multiplicative inverse of the other root, then  $a = \dots\dots\dots$

(a)  $\frac{1}{2}$  (b) 3 (c) 2 (d) -2

## Second Essay questions

Answer the following questions :

**1** In  $\triangle ABC$ ,  $D \in \overline{AB}$  where  $AD = 5$  cm. ,  $DB = 3$  cm.

,  $E \in \overline{AC}$  where  $AE = 4$  cm. ,  $EC = 6$  cm.

**Prove that :**

[1]  $\triangle ADE \sim \triangle ACB$

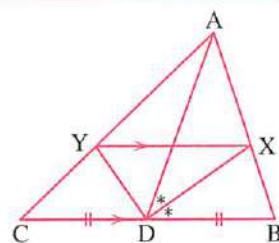
[2]  $DBCE$  is a cyclic quadrilateral.

**2** Investigate the sign of the function  $f : f(x) = x^2 + 3x - 10$  and illustrate it on a number line , then determine the solution set of the inequality :  $x^2 + 3x \leq 10$

**3** In the opposite figure :

[1] **Prove that :**  $\overrightarrow{DY}$  bisects  $\angle ADC$

[2] **Find :**  $m(\angle XDY)$



**4** If  $\cos x = \frac{3}{5}$  ,  $270^\circ < x < 360^\circ$

**Find the value of :**  $\sin(180^\circ - x) + \tan(90^\circ - x) + \tan(270^\circ - x)$

**5** In the opposite figure :

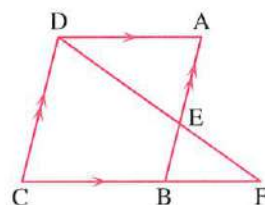
$ABCD$  is a parallelogram

,  $E \in \overline{AB}$  where  $\frac{AE}{EB} = \frac{3}{2}$

,  $\overline{DE} \cap \overline{CB} = \{F\}$

[1] **Prove that :**  $\triangle DCF \sim \triangle EAD$

[2] **Find :**  $\frac{a(\triangle DCF)}{a(\triangle EAD)}$



**Model**

**2**

Interactive test **2**



## First Multiple choice questions

Choose the correct answer from the given ones :

**1** The triangle in which the measure of two angles are  $50^\circ$  ,  $60^\circ$  is similar to the triangle in which the measure of two angles are  $60^\circ$  , .....

(a)  $70^\circ$

(b)  $110^\circ$

(c)  $80^\circ$

(d)  $30^\circ$

**2** If  $L$ ,  $2 - L$  are the roots of the equation :  $X^2 + kX + 6 = 0$  , then  $k = \dots\dots\dots$

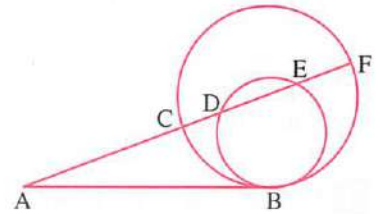
- (a) 1 (b)  $-2$  (c) 3 (d) 5

**3** The function  $f : f(X) = (X - 1)(X + 3)$  is positive in the interval  $\dots\dots\dots$

- (a)  $[-3, 1]$  (b)  $] -3, 1[$  (c)  $\mathbb{R} - [-3, 1]$  (d)  $\mathbb{R} - ] -3, 1[$

**4** In the opposite figure :

If  $\overline{AB}$  is a common tangent to  
two circles touching externally at B  
, then  $AC : AD = \dots\dots\dots : \dots\dots\dots$

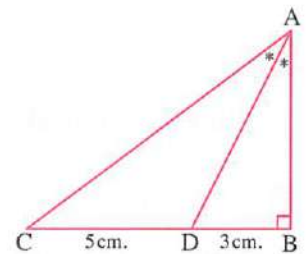


- (a)  $AB : AF$  (b)  $AF : AE$   
(c)  $AD : AF$  (d)  $AE : AF$

**5** In the opposite figure :

$AB = \dots\dots\dots$  cm.

- (a) 4 (b) 5  
(c) 6 (d) 7

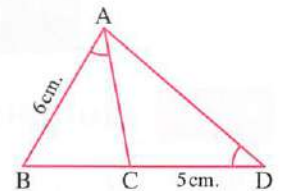


**6** If  $a$ ,  $b$  are two rational numbers , then the two roots of  
the equation :  $aX^2 + bX + b - a = 0$  are  $\dots\dots\dots$

- (a) complex and non-real. (b) complex conjugate.  
(c) rationals. (d) equal.

**7** In the opposite figure :

$C \in \overline{BD}$  ,  $m(\angle D) = m(\angle BAC)$   
,  $AB = 6$  cm. ,  $CD = 5$  cm.  
, then  $BC = \dots\dots\dots$  cm.

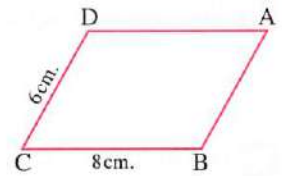


- (a) 3 (b) 4 (c) 5 (d) 6

**8 In the opposite figure :**

ABCD is a parallelogram  
 , its area =  $40 \text{ cm}^2$   
 , then  $m(\angle A) \simeq \dots\dots\dots$

- (a)  $37^\circ$  (b)  $56^\circ$  (c)  $53^\circ$  (d)  $34^\circ$

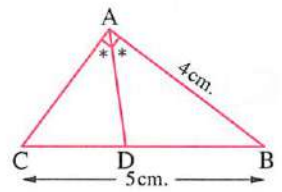
**9** If  $P_M(A) = P_N(A)$  where M , N are two circles , then .....

- (a)  $AM = AN$   
 (b) The radius length of M = the radius length of N  
 (c) A lies on the line of intersection of the two circles.  
 (d) A lies on the principle axis of the two circles M , N

**10 In the opposite figure :**

$BC = 5 \text{ cm}$  ,  $AB = 4 \text{ cm}$  ,  $\overline{AB} \perp \overline{AC}$  , then  $\frac{BD}{DC} = \dots\dots\dots$

- (a)  $\frac{4}{5}$  (b)  $\frac{3}{5}$   
 (c)  $\frac{3}{4}$  (d)  $\frac{4}{3}$

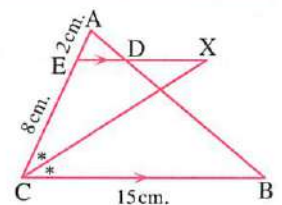
**11** The arc length in a circle of raduis 6 cm. opposite to central angle of measure  $\frac{\pi}{2}$  is .....

- (a)  $\frac{3\pi}{2} \text{ cm}$ . (b)  $2\pi \text{ cm}$ . (c)  $\frac{5\pi}{2} \text{ cm}$ . (d)  $3\pi \text{ cm}$ .

**12 In the opposite figure :**

If  $\overline{CX}$  bisects  $\angle ACB$  ,  $\overline{XD} \parallel \overline{BC}$  , then  $XD = \dots\dots\dots \text{ cm}$ .

- (a) 3 (b) 4  
 (c) 5 (d) 6

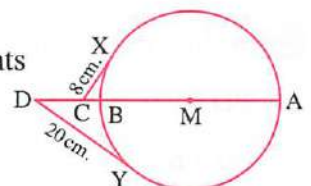
**13** If ABC is right-angled triangle at B ,  $\sin A + \cos C = 1$  , then  $\tan C = \dots\dots\dots$ 

- (a) 1 (b) -1 (c)  $\frac{1}{\sqrt{3}}$  (d)  $\sqrt{3}$

**14 In the opposite figure :**

If  $\overline{AB}$  is a diameter in circle M ,  $\overline{CX}$  ,  $\overline{YD}$  are two tangent segments to the circle M ,  $AB = 30 \text{ cm}$  ,  $CX = 8 \text{ cm}$  ,  $DY = 20 \text{ cm}$  , then  $DC = \dots\dots\dots \text{ cm}$ .

- (a) 2 (b) 6 (c) 8 (d) 10



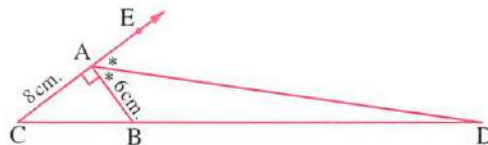
**15** The solution set of the equation :  $x^2 + 9 = 0$  in the set of complex numbers is .....

- (a)  $\{3, -3\}$  (b)  $\{-3i\}$  (c)  $\{3i, -3i\}$  (d)  $\emptyset$

**16** In the opposite figure :

The area of  $\triangle ABD = \dots\dots\dots \text{cm}^2$

- (a) 36 (b) 48  
(c) 54 (d) 72



**17** If the solution set of the inequality :  $x^2 - 4 \leq x + k$  is  $[-2, 3]$  , then  $k = \dots\dots\dots$

- (a)  $-6$  (b)  $1$  (c)  $2$  (d)  $10$

**18** The range of the function  $f : f(\theta) = 3 \sin 2\theta$  is .....

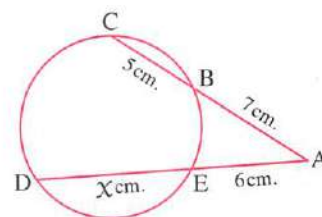
- (a)  $[-2, 2]$  (b)  $]-2, 2[$  (c)  $[-3, 3]$  (d)  $]-3, 3[$

**19** In the opposite figure :

$AB = 7 \text{ cm.}$  ,  $BC = 5 \text{ cm.}$  ,  $AE = 6 \text{ cm.}$

,  $DE = x \text{ cm.}$  , then the value of  $x = \dots\dots\dots$

- (a) 5 (b) 14  
(c) 12 (d) 8



**20** A is a point outside the circle M ,  $\overline{AB}$  is a tangent to the circle at B , draw  $\overline{AD}$  to intersect the circle at C and D where  $C \in \overline{AD}$  , if  $m(\widehat{DB}) = 150^\circ$  ,  $m(\widehat{BC}) = 80^\circ$

, then  $m(\angle A) = \dots\dots\dots^\circ$

- (a) 115 (b) 35 (c) 70 (d) 60

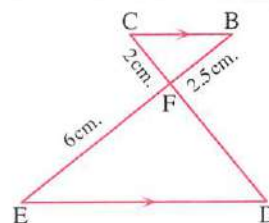
**21** The terminal side of angle  $\theta$  in standard position intersects the unit circle at point B  $(x, \frac{3}{5})$  where  $x < 0$  , then  $\sin(90^\circ + \theta) = \dots\dots\dots$

- (a)  $-0.8$  (b)  $-0.6$  (c)  $0.8$  (d)  $0.6$

**22** In the opposite figure :

$FD = \dots\dots\dots \text{cm.}$

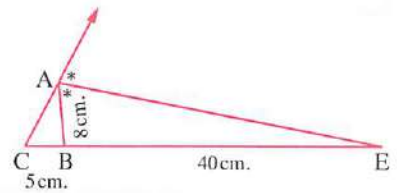
- (a) 3.6 (b) 4  
(c) 4.2 (d) 4.8



**23 In the opposite figure :**

AE = ..... cm.

- (a) 32 (b) 45  
(c) 48 (d)  $24\sqrt{3}$

**24** If  $\sin X = \cos y$ , then  $\sin (X + y) = \dots\dots\dots$ 

- (a) 1 (b) zero (c) -1 (d) otherwise.

**25** If one of the roots of the equation :  $X^2 - (m + 3)X + 3 = 0$  is additive inverse of the other, then  $m = \dots\dots\dots$ 

- (a) 3 (b) -3 (c) zero (d) otherwise.

**26** The two roots of the equation :  $aX^2 + bX + c = 0$  are real equal if  $b^2 = \dots\dots\dots$ 

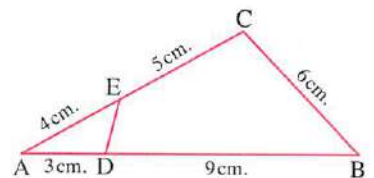
- (a)  $2ac$  (b)  $ac$  (c)  $4ac$  (d)  $-4ac$

**27** If  $L, M$  are the two roots of the equation :  $X^2 + X + 1 = 0$ , then  $L + M + LM = \dots\dots\dots$ 

- (a) zero (b) 1 (c) -1 (d) 2

**28** If  $X + yi = (2 - 3i)^2$ , then  $X + y = \dots\dots\dots$ 

- (a)  $-5 - 12i$  (b) -17 (c) 17 (d) 60

**Second Essay questions****Answer the following questions :****1 In the opposite figure :** $E \in \overline{AC}$ ,  $D \in \overline{AB}$  where  $AD = 3$  cm. $DB = 9$  cm. ,  $BC = 6$  cm. ,  $EC = 5$  cm. ,  $EA = 4$  cm.**Prove that :**  $\triangle ADE \sim \triangle ACB$ , then find the length of  $\overline{ED}$ **2** Find the general solution of the equation :  $\tan (\theta + 20^\circ) = \cot (3\theta + 30^\circ)$ , then find the values of  $\theta \in ]0^\circ, 90^\circ[$ **3** In  $\triangle ABC$ ,  $\overline{AD}$  bisects the interior angle and intersects  $\overline{BC}$  at  $D$ , if  $AC = 15$  cm.,  $AB = 27$  cm. ,  $BD = 18$  cm. , calculate the lengths of  $\overline{CD}$  and  $\overline{AD}$ **4** Find the values of  $X, y$  that satisfy the equation :  $\frac{(4 - 3i)(4 + 3i)}{2 + i} = X + yi$



7 If  $\overleftrightarrow{AB}$  is a tangent to circle M at point B and  $P_M(A) = 25 \text{ cm}^2$ , then  $AB = \dots\dots\dots$  cm.

- (a) 5 (b) 10 (c) 15 (d) 25

8 If L, M are the two roots of the quadratic equation  $(X - a)(X - b) = k$ , then the quadratic equation whose roots a, b is .....

- (a)  $(X - L)(X - M) = 0$  (b)  $(X - L)(X - M) + k = 0$   
(c)  $(X - L)(X - M) = k$  (d)  $X^2 - (L + M)X + k = 0$

9 The radian measure of central angle opposite to an arc of length 3 cm. in a circle its diameter length 4 cm. is .....

- (a)  $\left(\frac{2}{3}\right)^{\text{rad}}$  (b)  $\left(\frac{3}{2}\right)^{\text{rad}}$  (c)  $5^{\text{rad}}$  (d)  $6^{\text{rad}}$

10 In the opposite figure :

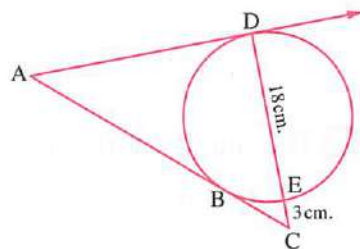
$\overrightarrow{AD}$ ,  $\overrightarrow{AB}$  are two tangents to the circle at D, B respectively.

$\overrightarrow{CE}$  intersects the circle at E, D

If  $CE = 3 \text{ cm}$ ,  $ED = 18 \text{ cm}$ .

, then  $(AC - AD) = \dots\dots\dots$  cm.

- (a)  $\sqrt{7}$  (b)  $2\sqrt{7}$  (c)  $3\sqrt{7}$  (d)  $6\sqrt{7}$

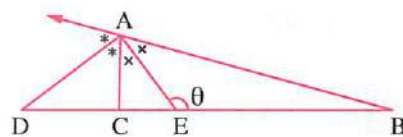


11 In the opposite figure :

If  $AD = 8 \text{ cm}$ ,  $AE = 6 \text{ cm}$ .

, then  $\tan \theta = \dots\dots\dots$

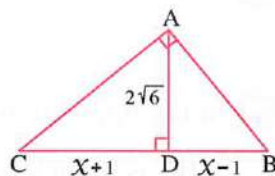
- (a)  $\frac{-4}{3}$  (b)  $\frac{-3}{4}$  (c)  $\frac{3}{4}$  (d)  $\frac{4}{3}$



12 In the opposite figure :

By using the shown givens, then  $X = \dots\dots\dots$

- (a) 5 (b) 12  
(c) 10 (d) 2.5



13 If  $\sin \theta = \cos \theta$  where  $\theta$  is the measure of an acute positive angle, then  $\tan 2\theta = \dots\dots\dots$

- (a) 1 (b) -1 (c) undefined. (d)  $\sqrt{3}$

**14 In the opposite figure :**

If the area of  $\triangle DEF = 6 \text{ cm}^2$

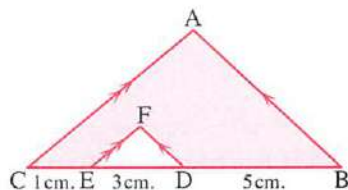
, then the area of the shaded area = .....  $\text{cm}^2$

(a) 27

(b) 36

(c) 48

(d) 54



**15** The function  $f : f(x) = ax^2 + bx + c$  has one sign in  $\mathbb{R}$  when .....

(a)  $b^2 - 4ac > 0$

(b)  $b^2 - 4ac < 0$

(c)  $b^2 - 4ac = 0$

(d)  $b^2 - 4ac \geq 0$

**16 In the opposite figure :**

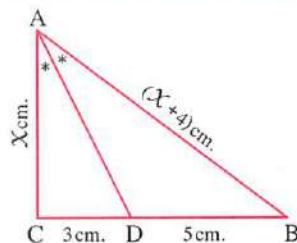
$x = \dots\dots\dots$

(a) 3

(b) 4

(c) 5

(d) 6



**17** The simplest form of the expression :  $\sin(180^\circ + \theta) \times \sec(270^\circ + \theta) = \dots\dots\dots$

(a)  $2 \sin \theta$

(b) 1

(c) -1

(d)  $2 \sec \theta$

**18** If  $(3x - 5)^\circ$  is the smallest positive measure ,  $(3y - 5)^\circ$  is the greatest negative measure of two equivalent angles in the standard position , then  $x - y = \dots\dots\dots$

(a)  $360^\circ$

(b)  $180^\circ$

(c)  $120^\circ$

(d)  $90^\circ$

**19**  $\cos^{-1} x + \sin^{-1} x = \dots\dots\dots$

(a) zero

(b)  $\frac{\pi}{4}$

(c)  $\frac{\pi}{2}$

(d)  $\pi$

**20** If  $x + yi = (1 + i)^3$  , then  $x + y = \dots\dots\dots$

(a) 4

(b) 2

(c) zero

(d) 6

**21 In the opposite figure :**

ABC is triangle ,  $X \in \overline{AB}$  ,  $Y \in \overline{AC}$

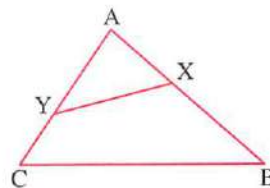
If XBCY is a cyclic quadrilateral , then .....

(a)  $\frac{AX}{AB} = \frac{AY}{AC}$

(b)  $AX \times AB = AY \times AC$

(c)  $\frac{AX}{XB} = \frac{AY}{YC}$

(d)  $(XY)^2 = AX \times AB$

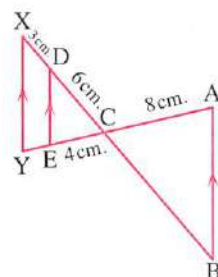


**22 In the opposite figure :**

$\overline{AB} \parallel \overline{DE} \parallel \overline{XY}$ ,  $AC = 8$  cm. ,  $CE = 4$  cm.

,  $CD = 6$  cm. ,  $DX = 3$  cm. , then  $BC + EY = \dots\dots\dots$  cm.

- (a) 12 (b) 15  
(c) 8 (d) 14



**23** The equation that has the two roots  $3i$  ,  $-3i$  is .....

- (a)  $x^2 + 9 = 0$  (b)  $x^2 = 9$  (c)  $x^2 + 3 = 0$  (d)  $x^2 = 3$

**24**  $\sin(90^\circ - \theta) \sec \theta = \dots\dots\dots$

- (a) 1 (b)  $-1$  (c) zero (d)  $90^\circ$

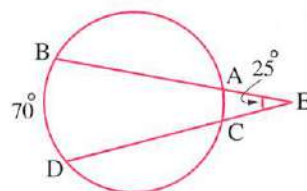
**25** If  $k$  is the scale factor of similarity between two similar polygons , then the two polygons are congruent if .....

- (a)  $k > 1$  (b)  $0 < k < 1$  (c)  $k = 1$  (d)  $k = 0$

**26 In the opposite figure :**

$m(\widehat{AC}) = \dots\dots\dots^\circ$

- (a) 20 (b) 30  
(c) 40 (d) 50



**27** If  $M$  ,  $(5 - M)$  are the two roots of the equation :  $x^2 - kx + 6 = 0$  , then  $k = \dots\dots\dots$

- (a)  $-5$  (b)  $5$  (c)  $6$  (d)  $-8$

**28** The two roots of the equation :  $x + \frac{9}{x} = 6$  are .....

- (a) two equal real roots. (b) two complex and non real roots.  
(c) two different real roots. (d) two equal imaginary numbers.

**Second Essay questions**

**Answer the following questions :**

**1** The ratio between the length of two corresponding sides of two similar polygons is  $5 : 3$

If the difference between their areas is  $32 \text{ cm}^2$

Find the area of each polygon.

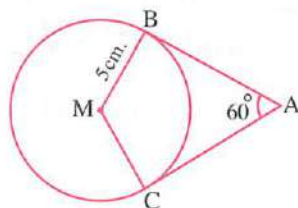
**2** Solve the following inequality in  $\mathbb{R}$  :  $(x + 3)^2 \leq 10 - 3(x + 3)$

**3 In the opposite figure :**

$\overline{AB}$ ,  $\overline{AC}$  are two tangent segments to the circle M at B and C

,  $m(\angle A) = 60^\circ$ ,  $MB = 5$  cm.

Find the length of the minor arc  $\widehat{BC}$



**4 Prove without using the calculator :**

$$\sin(600^\circ) \cos(-30^\circ) + \sin(150^\circ) \cos(240^\circ) = \sin \frac{3\pi}{2}$$

**5**  $\overline{AD}$  is a median in  $\triangle ABC$ ,  $\overrightarrow{DX}$  bisects  $\angle ADB$  and intersects  $\overline{AB}$  at X

,  $\overrightarrow{DY}$  bisects  $\angle ADC$  and intersects  $\overline{AC}$  at Y, **prove that :**  $\overline{XY} \parallel \overline{BC}$

**Model**

**4**

Interactive test **4**



**First Multiple choice questions**

**Choose the correct answer from the given ones :**

**1 In the opposite figure :**

If  $\overline{AD}$  is a tangent to the circle

,  $m(\angle A) = 55^\circ$ ,  $m(\widehat{DC}) = (3X - 10^\circ)$

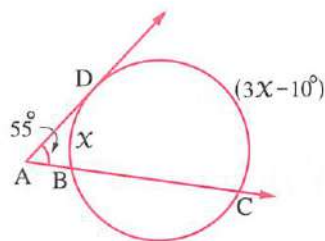
,  $m(\widehat{DB}) = X$ , then  $X = \dots\dots\dots^\circ$

(a) 120

(b) 60

(c) 30

(d) 15



**2** If  $\theta$  is the measure of an acute angle and  $\sin(\theta + 10^\circ) = \cos(50^\circ)$ , then  $\theta = \dots\dots\dots$

(a)  $30^\circ$

(b)  $40^\circ$

(c)  $20^\circ$

(d)  $50^\circ$

**3** The ratio between the length of two radii of two circles is  $3 : 5$ , if the area of the smaller circle is  $27 \text{ cm}^2$ , then the area of the greater circle equals  $\dots\dots\dots \text{ cm}^2$ .

(a) 45

(b) 50

(c) 75

(d) 100

**4** If  $X = -1$  is one of the two roots of the equation :  $X^2 - kX - 6 = 0$ , then  $k = \dots\dots\dots$

(a) 5

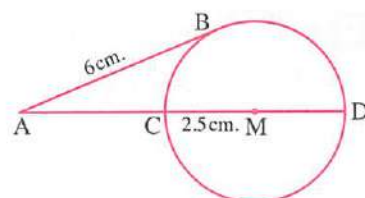
(b) -5

(c) 6

(d) -6

**5 In the opposite figure :**

$\overline{AB}$  is a tangent segment to circle  $M$  ,  
 $AB = 6$  cm. ,  $CM = 2.5$  cm.  
 , then  $AC = \dots\dots\dots$  cm.

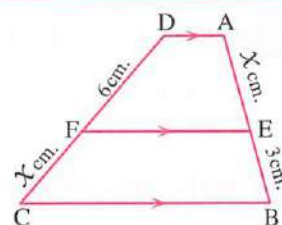


- (a) 9 (b) 4 (c) 2.5 (d) 5

**6 In the opposite figure :**

$X = \dots\dots\dots$

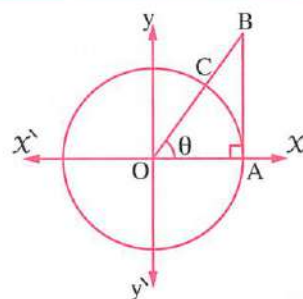
- (a) 6 (b)  $3\sqrt{2}$   
 (c)  $3\sqrt{3}$  (d) 18



**7 In the opposite figure :**

$\overline{AB}$  is a tangent segment of a unit circle , then  $OB = \dots\dots\dots$

- (a)  $\sin \theta$  (b)  $\cos \theta$   
 (c)  $\csc \theta$  (d)  $\sec \theta$



**8 The function  $f : f(X) = 3 - X$  is non-negative at  $X \in \dots\dots\dots$**

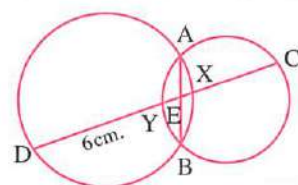
- (a)  $]-\infty, 3[$  (b)  $]-\infty, 3]$  (c)  $[3, \infty[$  (d)  $]3, \infty[$

**9 The degree measure of an inscribed angle opposite an arc whose length  $5\pi$  cm. in a circle with radius 15 cm. equals  $\dots\dots\dots$**

- (a)  $120^\circ$  (b)  $60^\circ$  (c)  $30^\circ$  (d)  $90^\circ$

**10 In the opposite figure :**

If  $DY = 6$  cm. and  $\frac{XE}{EY} = \frac{2}{3}$   
 , then  $CX = \dots\dots\dots$  cm.



- (a) 2 (b) 3  
 (c) 4 (d) 5

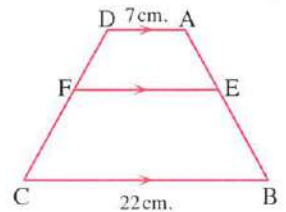
**11 If the function  $f : f(X) = a \cos bX$  where  $a > 0$  is a periodic function and its period  $\frac{\pi}{2}$  and its range  $[-1, 1]$  , then  $\left| \frac{a}{b} \right| = \dots\dots\dots$**

- (a)  $\frac{1}{2}$  (b) 1 (c)  $\frac{1}{8}$  (d)  $\frac{1}{4}$

**12 In the opposite figure :**

$\frac{AE}{EB} = \frac{2}{3}$  , then FE = ..... cm.

- (a) 9 (b) 11  
(c) 13 (d) 15



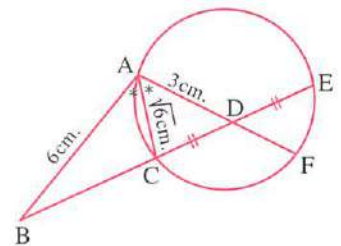
**13** If  $\triangle ABC \sim \triangle DEF$  ,  $m(\angle A) = 50^\circ$  ,  $m(\angle E) = 60^\circ$  , then  $m(\angle C) = \dots\dots\dots$

- (a)  $110^\circ$  (b)  $70^\circ$  (c)  $100^\circ$  (d)  $120^\circ$

**14 In the opposite figure :**

$\overrightarrow{AC}$  bisects  $\angle BAD$  , D is the midpoint of  $\overline{EC}$   
 $AC = \sqrt{6}$  cm. ,  $AD = 3$  cm.  
 $AB = 6$  cm. , then DF = ..... cm.

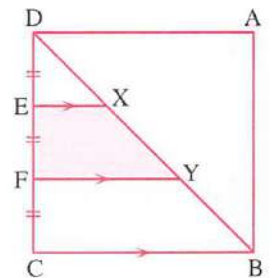
- (a) 2 (b) 3  
(c) 3.5 (d) 4



**15 In the opposite figure :**

ABCD is a square of side length 6 cm.  
 $DE = EF = FC$   
 , then the area of (polygon XYFE) = .....  $\text{cm}^2$

- (a) 6 (b) 8  
(c) 10 (d) 12



**16** If L , M are the two roots of the quadratic equation  $X^2 + 1 = 0$   
 , then  $L^{2018} + M^{2018} = \dots\dots\dots$

- (a)  $-2i$  (b)  $2i$  (c)  $-2$  (d)  $2$

**17** If one of the two roots of the equation  $(X + k)^2 - 6X = 0$  is additive inverse of the other  
 , then k = .....

- (a) 6 (b)  $-6$  (c) 3 (d) 9

**18** If the solution set of the inequality :  $X^2 - 10 < bX$  is  $] -2 , 5[$  , then b = .....

- (a)  $-10$  (b)  $-2$  (c) 3 (d) 5

19 The quadratic equation whose roots are :  $\frac{3}{i}$ ,  $\frac{3+3i}{1-i}$  is .....

(a)  $x^2 - 3x + 9 = 0$

(b)  $x^2 + 9 = 0$

(c)  $x^2 + 9x + 9 = 0$

(d)  $x^2 = 9$

20 ABC is a triangle in which AB = 8 cm. , AC = 6 cm. , BC = 7 cm. Draw  $\overrightarrow{AD}$  bisects  $\angle BAC$  ,  $\overrightarrow{AD} \cap \overline{BC} = \{D\}$  , then BD = ..... cm.

(a) 3

(b) 6

(c) 4

(d)  $\sqrt{17}$

21 In the opposite figure :

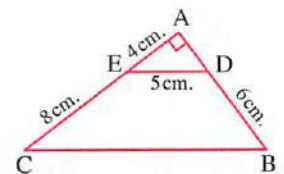
$\frac{DE}{BC} = \dots\dots\dots$

(a)  $\frac{1}{2}$

(b)  $\frac{3}{4}$

(c)  $\frac{1}{3}$

(d)  $\frac{2}{3}$



22 If one of the roots of the equation :  $3x^2 - (k+2)x + k^2 + 2k = 0$  is the multiplicative inverse of the other , then k = .....

(a) -3 or 1

(b) -3 or -1

(c) 3 or -1

(d) 3 or 1

23 If  $10 \sin x = 6$  where  $x$  is the greatest positive angle ,  $x \in [0, 2\pi[$  , then the numerical value of the expression :  $\sec(540^\circ + x)$  equals .....

(a)  $\frac{3}{5}$

(b)  $-\frac{5}{4}$

(c)  $\frac{5}{4}$

(d)  $-\frac{5}{3}$

24 In the opposite figure :

$\overline{DB} \cap \overline{EC} = \{A\}$

, AE = 9 cm. , AB = 10 cm. , AC = 15 cm.

, DA = 6 cm. , a ( $\Delta ADE$ ) =  $36 \text{ cm}^2$

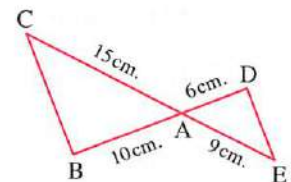
, then a ( $\Delta ABC$ ) = .....  $\text{cm}^2$

(a) 60

(b) 75

(c) 100

(d) 225



25 The range of the function  $f : f(x) = 4 \sin x$  where  $x \in [0, \pi]$  equals .....

(a)  $[0, 4]$

(b)  $[0, 4[$

(c)  $[-4, 0]$

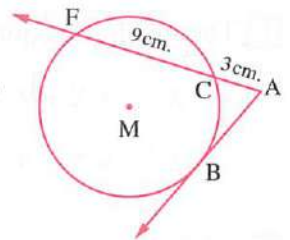
(d)  $[-4, 4]$

**26 In the opposite figure :**

$\overline{AB}$  touches the circle M at B ,  $\overline{AF}$  intersects the circle M at the two points C , F respectively. If AC = 3 cm.

, CF = 9 cm. , then  $P_M(A) = \dots\dots\dots$

- (a) 6 (b) 9 (c) 27 (d) 36



**27** If the two roots of the equation :  $x^2 - 4x + k = 0$  are real , then  $k \in \dots\dots\dots$

- (a)  $[4, \infty[$  (b)  $]-\infty, 4[$  (c)  $]4, \infty[$  (d)  $]-\infty, 4]$

**28** If  $3x - 2yi = (5 - 2i)^2$  , then  $y - x = \dots\dots\dots$

- (a) 17 (b) -3 (c) 3 (d)  $21 - 20i$

**Second Essay questions**

**Answer the following questions :**

**1** Investigate in  $\mathbb{R}$  the sign of the function  $f : f(x) = 8 + 2x - x^2$  showing that on number line , then find in  $\mathbb{R}$  the solution set of the inequality :  $8 + 2x - x^2 \geq 0$

**2 In the opposite figure :**

M and N are two intersecting circles at A and B ,  $C \in \overline{BA}$

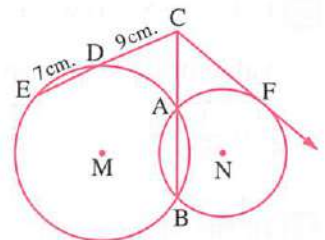
,  $C \notin \overline{BA}$  Draw  $\overline{CD}$  to intersect circle M at D , E

where CD = 9 cm. , DE = 7 cm.

Draw  $\overline{CF}$  to touch circle N at F

[1] Prove that :  $P_M(C) = P_N(C)$

[2] If : AB = 10 cm. , find the length of each  $\overline{AC}$  ,  $\overline{CF}$



**3** In  $\triangle ABC$  , AB = 8 cm. , AC = 4 cm. ,  $D \in \overline{AC}$  ,  $D \notin \overline{AC}$  where CD = 12 cm.

**Prove that :**  $\overline{AB}$  touches the circle passes through the points B , C , D

**4** If  $\triangle ABC$  is right-angled triangle at angle C ,  $\sin A + \cos B = 1$

Find the value of  $\sin 5A$

**5** ABC is a triangle ,  $D \in \overline{AB}$  where AD = 2 BD ,  $E \in \overline{AC}$  where  $\overline{DE} \parallel \overline{BC}$

If the area of  $\triangle ADE = 60 \text{ cm}^2$  , find the area of the trapezium DBCE

## Model

5

Interactive test 5



## First Multiple choice questions

Choose the correct answer from the given ones :

1 In the opposite figure :

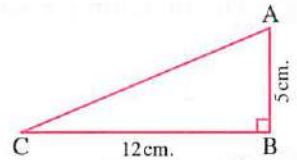
$$\sin \left( \tan^{-1} \left( \frac{5}{12} \right) \right) = \dots\dots\dots$$

(a)  $\frac{5}{12}$

(b)  $\frac{5}{13}$

(c)  $\frac{12}{13}$

(d) 13

2 If L, M are the two roots of the equation :  $x^2 + 3x - 4 = 0$  , then LM = .....

(a) 3

(b) -3

(c) 4

(d) -4

3 The solution set of the equation :  $x^2 + 9 = 0$  in  $\mathbb{R}$  is .....

(a)  $\{-3\}$

(b)  $\{3\}$

(c)  $\{-3, 3\}$

(d)  $\emptyset$

4 If  $S_1$  is the solution set of the inequality :  $x^2 - x - 2 \leq 0$  in  $\mathbb{R}$  and  $S_2$  is the solution set of the inequality :  $x^2 + x - 2 \leq 0$  in  $\mathbb{R}$  , then  $S_1 \cap S_2 = \dots\dots\dots$ 

(a)  $\emptyset$

(b)  $[-2, 2]$

(c)  $[-1, 1]$

(d)  $\mathbb{R} - ]-1, 1[$

5 In the opposite figure :

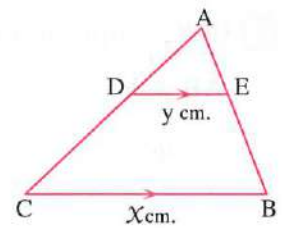
If  $\overline{DE} \parallel \overline{BC}$  ,  $DE = y$  cm.,  $BC = x$  cm. and  $2x^2 - 3xy - 5y^2 = 0$ ,  $AB = 10$  cm. , then  $EB = \dots\dots\dots$  cm.

(a) 3

(b) 4

(c) 6

(d) 8

6 The angle with measure  $585^\circ$  in standard position is equivalent to the angle with measure .....

(a)  $\frac{1}{4} \pi$

(b)  $\frac{5}{4} \pi$

(c)  $\frac{3}{4} \pi$

(d)  $\frac{7}{4} \pi$

7 If  $\triangle ABC \sim \triangle XYZ$  and  $AB = 3 XY$  , then  $\frac{a(\triangle XYZ)}{a(\triangle ABC)} = \dots\dots\dots$ 

(a)  $\frac{1}{3}$

(b)  $\frac{1}{9}$

(c)  $\frac{4}{1}$

(d)  $\frac{9}{1}$

**8 In the opposite figure :**

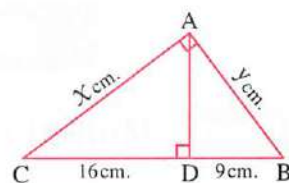
$$\frac{y}{x} = \dots\dots\dots$$

(a) 1

(b)  $\frac{4}{3}$

(c)  $\frac{3}{4}$

(d) 2



**9** The function  $y = \sin\left(\frac{\pi}{4} + x\right)$  has maximum value at  $x = \dots\dots\dots$

(a)  $\frac{\pi}{2}$

(b)  $-\frac{\pi}{2}$

(c)  $\frac{\pi}{4}$

(d) zero

**10** The sign of  $f : f(x) = -5x$  is negative at  $\dots\dots\dots$

(a)  $x > -5$

(b)  $x < -5$

(c)  $x > 0$

(d)  $x < 0$

**11 In the opposite figure :**

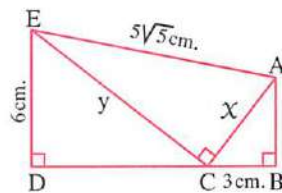
$$x + y = \dots\dots\dots \text{ cm.}$$

(a) 12

(b) 15

(c) 18

(d) 21



**12** If  $\overline{AB}$  is a tangent to a circle at B,  $\overline{AC}$  intersects the circle at C, D where  $C \in \overline{AD}$ ,  $AC = 3 \text{ cm}$ ,  $AB = 6 \text{ cm}$ , then  $CD = \dots\dots\dots \text{ cm}$ .

(a) 6

(b) 9

(c) 12

(d) 15

**13 In the opposite figure :**

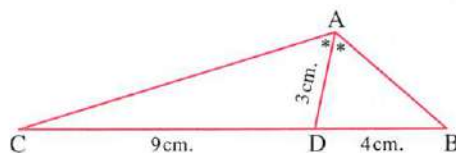
$$AB \times AC = \dots\dots\dots \text{ cm}^2$$

(a) 36

(b) 45

(c) 12

(d) 27



**14** In circle M, if two chords  $\overline{AB}$  and  $\overline{CF}$  intersecting at D, then  $\dots\dots\dots$

(a)  $P_M(D) = (AB)^2 - r^2$

(b)  $AD \times DB = AM \times MB$

(c)  $P_M(D) + AD \times DB = \text{zero}$

(d)  $P_M(D) = CD \times DF$

**15** If  $\tan(4\theta) = \cot(5\theta)$ , then  $\sin(3\theta) = \dots\dots\dots$  where  $3\theta$  is the measure of an acute angle.

(a)  $\frac{1}{2}$

(b) 1

(c) -1

(d)  $\frac{\sqrt{3}}{2}$

**16 In the opposite figure :**

The radius length of semicircle (M) = 10 cm.

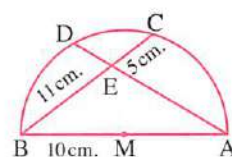
, then ED = ..... cm.

(a)  $\frac{50}{13}$

(b)  $\frac{55}{13}$

(c)  $\frac{57}{13}$

(d)  $\frac{59}{13}$



**17** If the two roots of the equation :  $aX^2 + bX + c = 0$  are equal in value but different in signs , then .....

(a)  $c = 0$

(b)  $a = 0$

(c)  $b = 0$

(d) otherwise.

**18 In the opposite figure :**

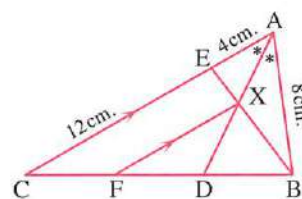
$\frac{DF}{BC} = \dots\dots\dots$

(a)  $\frac{4}{3}$

(b)  $\frac{2}{3}$

(c)  $\frac{3}{5}$

(d)  $\frac{1}{3}$



**19** If the distance between point A from the centre of a circle equals 24 cm. and the power of this point with respect to this circle equals 176 , then the radius length of this circle equals ..... cm.

(a)  $4\sqrt{47}$

(b) 400

(c) 20

(d) 38

**20** The length of an arc opposite to a central angle of measure  $150^\circ$  in a circle with radius length 8 cm. equals ..... cm.

(a)  $\frac{20}{3} \pi$

(b)  $\frac{17}{2} \pi$

(c)  $8 \pi$

(d) 20

**21 In the opposite figure :**

$\overline{XY} \parallel \overline{BC}$  ,  $\overline{XZ} \parallel \overline{BY}$

, AX = 6 cm. , XB = 9 cm. , AZ = 3 cm.

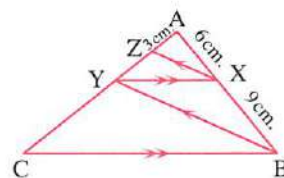
, then the length of  $\overline{ZC}$  = ..... cm.

(a) 4.5

(b)  $15\frac{3}{4}$

(c) 15

(d)  $12\frac{3}{4}$



**22** If  $\sin 2\theta = \cos \theta$  , then  $\theta$  could be equal ..... $^\circ$

(a) 18

(b) 30

(c) 36

(d) 45

**23** If  $(2i)$  is a root of the quadratic equation :  $x^2 + ax + b = 0$  where the coefficients of its terms are real numbers , then all the following are true except .....

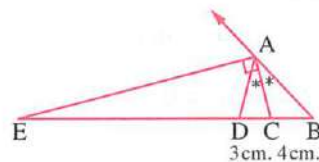
- (a) the other root of the quadratic equation is  $(-2i)$
- (b) the sum of the roots = zero
- (c) the product of the roots =  $-4$
- (d) the discriminant of the quadratic equation  $< \text{zero}$

**24** In the opposite figure :

$\overline{AC}$  bisects  $\angle A$  of triangle  $ABD$  internally ,  $\overline{AE} \perp \overline{AC}$

,  $BC = 4 \text{ cm.}$  ,  $CD = 3 \text{ cm.}$  , then  $BE : ED = \dots\dots\dots$

- (a)  $7 : 4$
- (b)  $7 : 3$
- (c)  $3 : 4$
- (d)  $4 : 3$



**25** If  $f(x) = x + 2$  , where  $x \in ]-4, 3[$  , then  $f(x)$  is positive at  $x \in \dots\dots\dots$

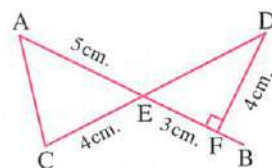
- (a)  $] -\infty, -2[$
- (b)  $] -2, \infty[$
- (c)  $] -4, -2[$
- (d)  $] -2, 3[$

**26** In the opposite figure :

If  $\overline{AB} \cap \overline{DC} = \{E\}$  ,  $AE = 5 \text{ cm.}$  ,  $EF = 3 \text{ cm.}$  ,  $EC = 4 \text{ cm.}$

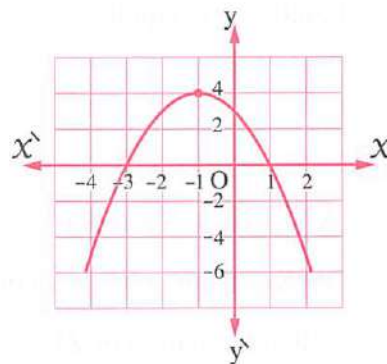
,  $DF = 4 \text{ cm.}$  ,  $\overline{DF} \perp \overline{BE}$  , the points  $A, B, C, D$  lie on a circle , then the length of  $\overline{FB} = \dots\dots\dots \text{ cm.}$

- (a)  $0.5$
- (b)  $1$
- (c)  $1.5$
- (d)  $2$



**27** If the opposite figure represents a graph of a quadratic function in one variable , then the rule of the function can be written as .....

- (a)  $f(x) = -x^2 - 2x + 3$
- (b)  $f(x) = -x^2 + 2x + 3$
- (c)  $f(x) = x^2 + 2x + 3$
- (d)  $f(x) = -x^2 + 2x - 3$



**28** If the roots of the equation :  $kx^2 - 8x + 16 = 0$  are two complex and non real , then .....

- (a)  $k > 2$
- (b)  $k < 2$
- (c)  $k \in ]1, 10[$
- (d)  $k > 1$

## Second Essay questions

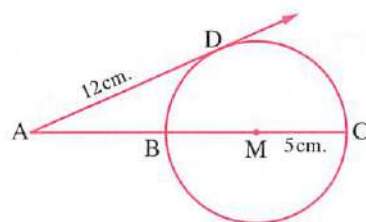
Answer the following questions :

### 1 In the opposite figure :

The radius of circle M is 5 cm.

,  $\overrightarrow{AD}$  is a tangent at D ,  $AD = 12$  cm.

Find the length of  $\overline{AC}$



### 2 If $\sin \theta = \frac{4}{5}$ where $90^\circ < \theta < 180^\circ$ Find the value of :

$$\sin (180^\circ - \theta) + \tan (360^\circ - \theta) + 2 \sin (270^\circ - \theta)$$

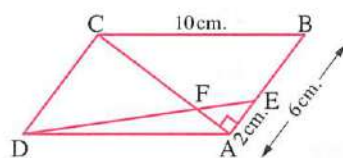
### 3 If $x = \frac{13+13i}{5+i}$ , $y = \frac{5+i}{1+i}$ , find : $x + y$

### 4 In the opposite figure :

ABCD is a parallelogram in which  $AB = 6$  cm. ,  $BC = 10$  cm.

,  $m(\angle BAC) = 90^\circ$  ,  $E \in \overline{AB}$  such that :  $AE = 2$  cm.

,  $\overline{DE}$  intersects  $\overline{AC}$  at F **Prove that** :  $\triangle AFE$  is an isosceles triangle.

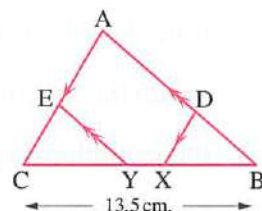


### 5 In the opposite figure :

ABC is a triangle in which :  $\overline{DX} \parallel \overline{AC}$  ,  $\overline{EY} \parallel \overline{AB}$  ,

$BC = 13.5$  cm. ,  $\frac{AD}{DB} = \frac{3}{2}$  ,  $EC = \frac{4}{5} AE$

Find the length of :  $\overline{XY}$



## Model

## 6

Interactive test 6



## First Multiple choice questions

Choose the correct answer from the given ones :

### 1 If the two roots of the equation : $4x^2 - 12x + c = 0$ are real and equal , then $c = \dots\dots\dots$

(a) 3

(b) 4

(c) 9

(d) 16

### 2 In the opposite figure :

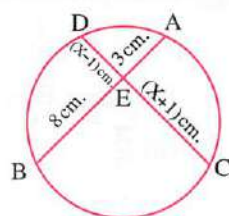
$x = \dots\dots\dots$

(a) 25

(b) 24

(c) 5

(d) 8



**3** The solution set of the equation :  $(X + 1)^2 = \text{zero}$  in  $\mathbb{R}$  is .....

- (a)  $\{-1\}$  (b)  $\{1\}$  (c)  $\{-1, 1\}$  (d)  $\emptyset$

**4** If  $b^2 - 4ac < 0$  in the equation  $aX^2 + bX + c = 0$ , then the solution set of the inequality  $aX^2 + bX + c < 0$  where  $a$  is negative is .....

- (a)  $\mathbb{R}$  (b)  $\emptyset$  (c)  $\mathbb{R}^+$  (d)  $\mathbb{R}^-$

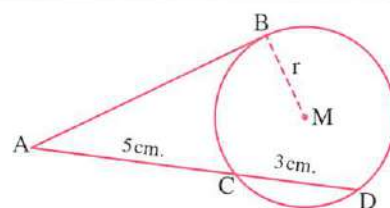
**5** All ..... are similar.

- (a) triangles (b) rectangles (c) parallelograms (d) squares

**6** In the opposite figure :

$P_M(A) = \dots\dots\dots$

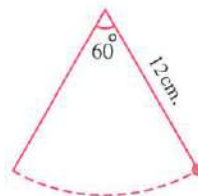
- (a) 25 (b)  $(AB)^2 - r^2$   
(c) 40 (d)  $(AM)^2 - (AB)^2$



**7** In the opposite figure :

A pendulum swings through an angle of measure  $60^\circ$   
if the length of its string is 12 cm.  
, then the length of the circular path covered by  
the pendulum equals .....

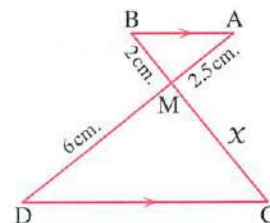
- (a)  $3\pi$  cm. (b)  $4\pi$  cm.  
(c)  $6\pi$  cm. (d)  $8\pi$  cm.



**8** In the opposite figure :

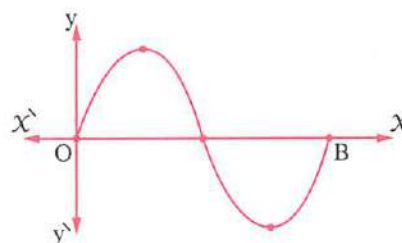
$X = \dots\dots\dots$  cm.

- (a) 3.6 (b) 4  
(c) 4.2 (d) 4.8



**9** The opposite figure represents the curve  $y = 3 \sin \frac{1}{2} X$ , then the  $X$  coordinates of the point B is .....

- (a)  $\frac{\pi}{2}$  (b)  $\pi$   
(c)  $2\pi$  (d)  $4\pi$



10  $\sec (\cos^{-1} \text{zero}) = \dots\dots\dots$

- (a) 1 (b)  $-1$  (c) undefind. (d) zero

11 The angle with measure  $(-120^\circ)$  lies in the  $\dots\dots\dots$  quadrant.

- (a) first (b) second (c) third (d) fourth

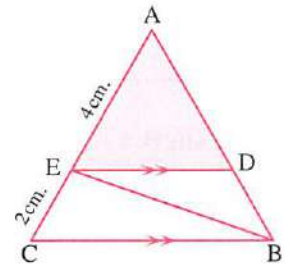
12 In the opposite figure :

If  $\overline{DE} \parallel \overline{BC}$

and the area of  $(\Delta EBC) = 9 \text{ cm}^2$

, then the area of  $(\Delta ADE) = \dots\dots\dots \text{cm}^2$

- (a) 6 (b) 12  
(c) 18 (d) 27



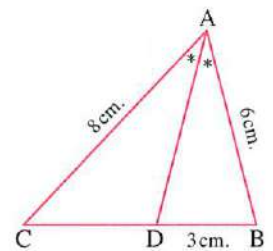
13 In the opposite figure :

$\overline{AD}$  bisects  $\angle BAC$ ,  $AB = 6 \text{ cm}$ .

,  $AC = 8 \text{ cm}$ ,  $BD = 3 \text{ cm}$ .

, then  $AD = \dots\dots\dots \text{cm}$ .

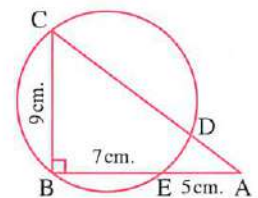
- (a) 4 (b) 5  
(c) 6 (d) 8



14 In the opposite figure :

$DC = \dots\dots\dots \text{cm}$ .

- (a) 9 (b) 10  
(c) 11 (d) 12



15 If  $a$ ,  $b$  and  $c$  are integers,  $a + b + c = 0$ ,  $a \neq c$ , then the roots of the equation :

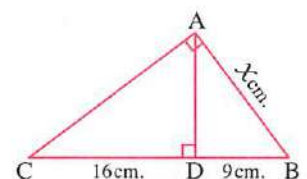
$(b + c - a)X^2 + (c + a - b)X + (a + b - c) = 0$  are  $\dots\dots\dots$

- (a) real and equal. (b) distinct rational real.  
(c) distinct irrational real. (d) not real.

16 In the opposite figure :

$X = \dots\dots\dots$

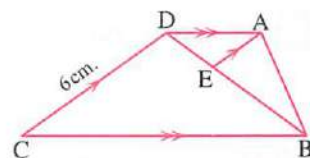
- (a) 9 (b) 12  
(c) 20 (d) 15



**17 In the opposite figure :**

If  $BE = 2 ED$   
 , then  $AE = \dots\dots\dots$  cm.

- (a) 1 (b) 2 (c) 3 (d) 4



**18 The sign of function  $f : f(x) = 7 - x$  is negative in the interval .....**

- (a)  $]-\infty, 7[$  (b)  $]-\infty, \infty[$  (c)  $]7, \infty[$  (d)  $]-7, 7[$

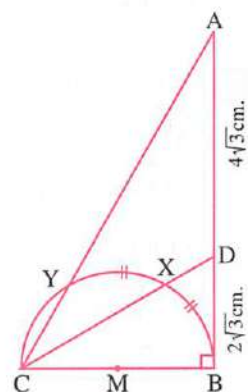
**19 If  $\sin \theta = -\frac{1}{2}$  ,  $\cos \theta = \frac{\sqrt{3}}{2}$  , then  $\theta = \dots\dots\dots$**

- (a)  $30^\circ$  (b)  $150^\circ$  (c)  $210^\circ$  (d)  $330^\circ$

**20 In the opposite figure :**

If  $m(\widehat{BX}) = m(\widehat{XY})$   
 and  $\overrightarrow{BA}$  is a tangent to the circle M at B  
 ,  $BD = 2\sqrt{3}$  cm. ,  $AD = 4\sqrt{3}$  cm.  
 , then  $AY = \dots\dots\dots$  cm.

- (a)  $4\sqrt{3}$  (b) 6  
 (c) 9 (d) 12



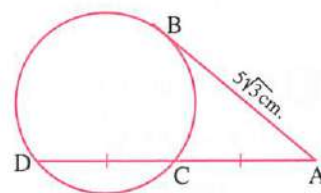
**21 If  $(2 + 3i) + (1 - i) = x + yi$  , then  $x + y = \dots\dots\dots$**

- (a) 2 (b) -4 (c) 5 (d) 7

**22 In the opposite figure :**

$\overline{AB}$  is a tangent segment , C is the midpoint of  $\overline{AD}$   
 ,  $AB = 5\sqrt{3}$  cm. , then  $CD = \dots\dots\dots$  cm.

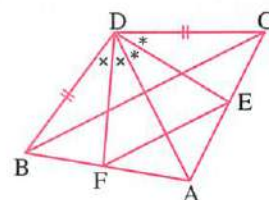
- (a)  $2\sqrt{6}$  (b)  $5\sqrt{6}$   
 (c) 5 (d)  $2.5\sqrt{6}$



**23 In the opposite figure :**

$\frac{CD}{DA} = \dots\dots\dots$

- (a)  $\frac{AE}{EC}$  (b)  $\frac{DE}{DF}$   
 (c)  $\frac{AC}{AB}$  (d)  $\frac{BF}{FA}$

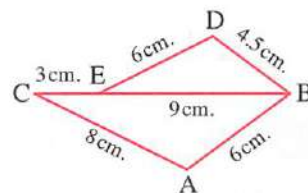


24 If  $f(x) = x^2 - 7x + 12$ ,  $x \in \mathbb{R}$ , then all the following are true except .....

- (a) the solution set of the equation  $f(x) = 0$  is  $\{3, 4\}$   
 (b) the solution set of the inequality  $f(x) > 0$  is  $\mathbb{R} - [3, 4]$   
 (c) the solution set of the inequality  $f(x) < 0$  is  $]3, 4[$   
 (d)  $f(x)$  is positive in the interval  $\mathbb{R} - ]3, 4[$

25 In the opposite figure :

B, E and C are collinear. If  $CE = 3$  cm.,  $BE = 9$  cm.,  
 $BD = 4.5$  cm.,  $DE = 6$  cm.,  $BA = 6$  cm.,  $AC = 8$  cm.,  
 then the scale factor of the similarity of the two  
 triangles ABC, DBE = .....



- (a) 4 : 3 (b) 3 : 4 (c) 16 : 9 (d) 9 : 16

26 If  $\tan(180^\circ + 5\theta) + \tan(270^\circ + 4\theta) = 0$ , then the value of  $\theta$  which satisfies the equation, where  $\theta \in ]0, \frac{\pi}{2}[$  from the following equals .....

- (a) 5 (b) 10 (c) 20 (d) 90

27 The quadratic equation in which each of its two roots more than the two roots of the equation :  $x^2 - 3x + 2 = 0$  by 2 is .....

- (a)  $x^2 - 3x + 2 = 0$  (b)  $x^2 + 7x + 12 = 0$   
 (c)  $x^2 - 7x + 12 = 0$  (d)  $x^2 - 7x - 12 = 0$

28 If L is one of the roots of the equation :  $x^2 + 4x + 7 = 0$ , then  $(L + 2)^2 = \dots\dots\dots$

- (a) -11 (b) 11 (c) 3 (d) -3

## Second Essay questions

Answer the following questions :

1 Find the values of  $\theta$  where  $0^\circ \leq \theta \leq 90^\circ$  which satisfies :

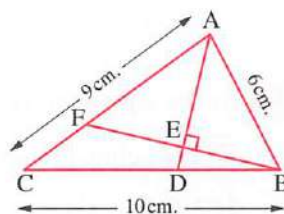
$$\tan(\theta + 20^\circ) = \cot(3\theta + 30^\circ)$$

2 In the opposite figure :

ABC is a triangle in which  $AB = 6$  cm.,  $AC = 9$  cm.,  
 and  $BC = 10$  cm.,  $D \in \overline{BC}$  where  $BD = 4$  cm.,  
 $\overline{BE} \perp \overline{AD}$  and intersects  $\overline{AD}$  and  $\overline{AC}$  at E and F respectively.

[1] Prove that :  $\overline{AD}$  bisects  $\angle A$

[2] Find : Area of  $\triangle ABF$  : Area of  $\triangle CBF$



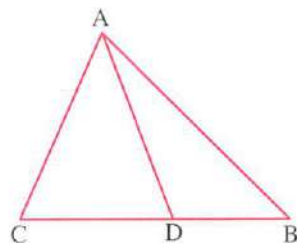
- 3** If the terminal side of angle  $\theta$  in the standard position intersects the unit circle

at point  $\left(\frac{\sqrt{5}}{3}, -\frac{2}{3}\right)$  Find the value of :  $\sin\left(\frac{\pi}{2} - \theta\right) + \cot(2\pi - \theta)$

- 4** In the opposite figure :

If  $(AC)^2 = CD \times CB$

Prove that :  $\triangle ACD \sim \triangle BCA$



- 4** In the opposite figure :

The two circles M and N are intersecting at

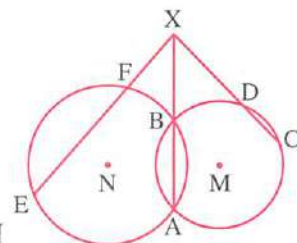
A and B where  $\overline{AB} \cap \overline{CD} \cap \overline{EF} = \{X\}$ ,

$XD = 2 DC$ ,  $EF = 10$  cm. and  $P_N(X) = 144$

[1] Prove that :  $\overline{AB}$  is the principle axis to the two circles M and N

[2] Find the length of each of :  $\overline{XC}$  and  $\overline{XF}$

[3] Prove that : CDFE is a cyclic quadrilateral.



**Model**

**7**

Interactive test **7**



## First Multiple choice questions

Choose the correct answer from the given ones :

- 1** If the sum of the measures of interior angles in any convex polygon  $= 180^\circ (n - 2)$  where  $n$  is the number of sides, then the measure of an interior angle in a regular hexagon in radian = .....

(a)  $\frac{\pi}{3}$

(b)  $\frac{3\pi}{4}$

(c)  $\frac{2\pi}{3}$

(d)  $\frac{\pi}{2}$

- 2** The angle with measure  $\frac{31\pi}{6}$  lies in the ..... quadrant.

(a) first

(b) second

(c) third

(d) fourth

- 3** In the opposite figure :

$\overline{CD}$  touches the semicircle M at D

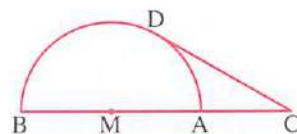
If  $2 CA = AB = 6$  cm. , then  $CD =$  ..... cm.

(a) 6

(b) 3

(c)  $3\sqrt{3}$

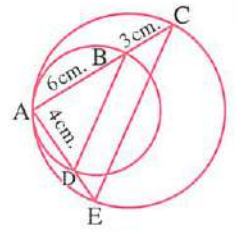
(d) 27



**4 In the opposite figure :**

Two circles touching internally at A  
 , then ED = ..... cm.

- (a) 2 (b) 3  
 (c) 3.5 (d) 4



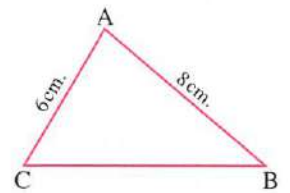
**5** If  $2 \cos \theta = -\sqrt{3}$ ,  $\pi < \theta < \frac{3\pi}{2}$ , then  $\theta =$  .....

- (a)  $\frac{\pi}{3}$  (b)  $\frac{6\pi}{7}$  (c)  $\frac{4\pi}{3}$  (d)  $\frac{7\pi}{6}$

**6 In the opposite figure :**

If  $m(\angle A) = 2 m(\angle B)$ , then BC = ..... cm.

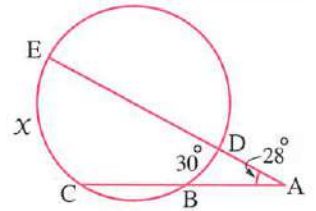
- (a)  $3\sqrt{10}$  (b)  $2\sqrt{21}$   
 (c) 12 (d) 10



**7 In the opposite figure :**

$x =$  .....

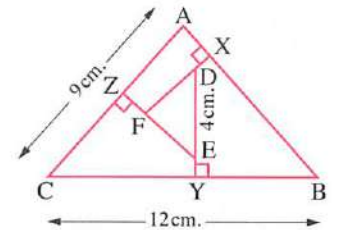
- (a)  $30^\circ$  (b)  $60^\circ$   
 (c)  $86^\circ$  (d)  $26^\circ$



**8 In the opposite figure :**

If  $\overline{FX} \perp \overline{AB}$ ,  $\overline{DY} \perp \overline{BC}$ ,  $\overline{EZ} \perp \overline{AC}$ , AC = 9 cm.  
 , BC = 12 cm. , DE = 4 cm. , then EF = ..... cm.

- (a) 2 (b) 3  
 (c) 5 (d) 6



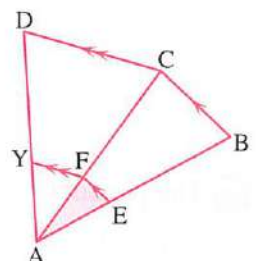
**9** Which of the following is a factorization to the expression :  $x^2 + 4$  ?

- (a)  $(x - 2)(x + 2)$  (b)  $(x + 2)^2$   
 (c)  $(x - 2i)^2$  (d)  $(x - 2i)(x + 2i)$

**10 In the opposite figure :**

If the area of (polygon DYFC) =  $40 \text{ cm}^2$   
 , the area of (polygon FEBC) =  $32 \text{ cm}^2$   
 , the area of ( $\triangle AFY$ ) =  $5 \text{ cm}^2$   
 , then the area of ( $\triangle AEF$ ) = .....  $\text{cm}^2$

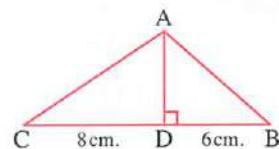
- (a) 3 (b) 4  
 (c) 5 (d) 6



**11 In the opposite figure :**

$AB \cos B + AC \cos C = \dots\dots\dots$  cm.

- (a) 6 (b) 8  
(c) 14 (d) 48



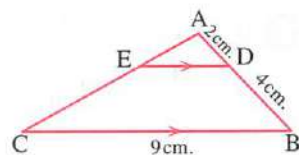
**12 In the opposite figure :**

If the area of  $\triangle ADE = 8 \text{ cm}^2$

, then the area of the figure

DBCE =  $\dots\dots\dots \text{ cm}^2$

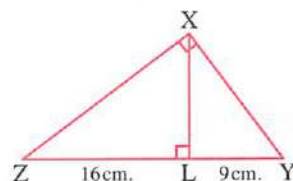
- (a) 27 (b) 64 (c) 24 (d) 16



**13 In the opposite figure :**

$XL = \dots\dots\dots$  cm.

- (a) 7 (b) 12  
(c) 20 (d) 144



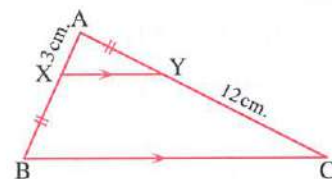
**14 The function  $f : f(x) = 2x$  is positive in  $\dots\dots\dots$**

- (a)  $\mathbb{R}$  (b)  $\mathbb{R}^+$  (c)  $\mathbb{R}^-$  (d)  $\mathbb{R} - \{0\}$

**15 In the opposite figure :**

$AC = \dots\dots\dots$  cm.

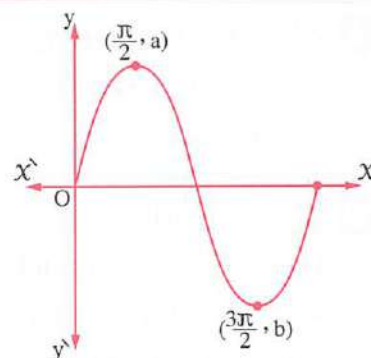
- (a) 15 (b) 16  
(c) 18 (d) 20



**16 The opposite figure show the curve**

$y = \sin x$ , then  $|a| + |b| = \dots\dots\dots$

- (a) 1  
(b) 2  
(c)  $\pi$   
(d)  $2\pi$



**17 The product of the roots of the equations :**

$aX^2 + bX + c = 0$  ,  $bX^2 + cX + a = 0$  ,  $cX^2 + aX + b = 0$  equals  $\dots\dots\dots$

- (a) ABC (b) -1 (c) 1 (d) zero

18 If  $x + yi = i^{15} + 2\sqrt{-4}$ , then  $x + y = \dots\dots\dots$

- (a) 3 (b) 4 (c) zero (d) -3

19 If the two roots of the equation :  $x^2 + 4x + k = 0$  are distinct real, then  $k \in \dots\dots\dots$

- (a)  $]-\infty, 4[$  (b)  $]4, \infty[$  (c)  $]-\infty, 4]$  (d)  $\{4\}$

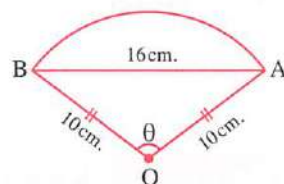
20 If  $AM = 12$  cm. ,  $r = 9$  cm. , where A is point outside circle M , then  $P_M(A) = \dots\dots\dots$

- (a) 65 (b) 63 (c) 49 (d) 7

21 In the opposite figure :

$\widehat{AB}$  is an arc in a circle whose centre O  
 , then find the length of  $\widehat{AB} \simeq \dots\dots\dots$  cm.

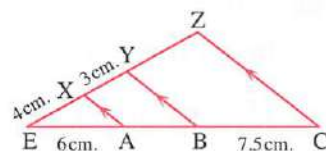
- (a) 19 (b) 25  
 (c) 18 (d) 21



22 In the opposite figure :

$AB + YZ = \dots\dots\dots$  cm.

- (a) 5 (b) 13  
 (c) 11 (d) 9.5



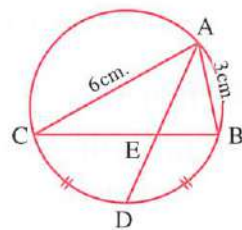
23  $(x + 2i)(x - 2i) = \dots\dots\dots$

- (a)  $x^2 + 4$  (b)  $x^2 - 4$   
 (c)  $4xi - 4$  (d)  $x^2 - 4xi + 4$

24 In the opposite figure :

$\frac{BE}{BC} = \dots\dots\dots$

- (a)  $\frac{1}{2}$  (b)  $\frac{1}{3}$   
 (c) 2 (d) 3



25 The solution set of the equation :  $x^2 + 1 = 0$  in  $\mathbb{R}$  is  $\dots\dots\dots$

- (a)  $\{1\}$  (b)  $\{1, -1\}$  (c)  $\emptyset$  (d)  $\{-i, i\}$

26 If the ratio between the areas of two similar polygons is 16 : 25 , then the ratio between their two corresponding sides =  $\dots\dots\dots$

- (a) 2 : 5 (b) 4 : 5 (c) 16 : 25 (d) 16 : 41

**27** The quadratic equation whose roots are :  $2 - \sqrt{3}$  ,  $2 + \sqrt{3}$  is .....

(a)  $x^2 + 2x + 3 = 0$

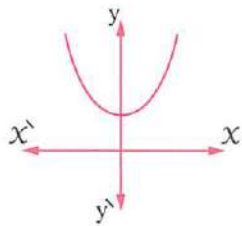
(b)  $x^2 - 4x + 1 = 0$

(c)  $x^2 - 4x + 7 = 0$

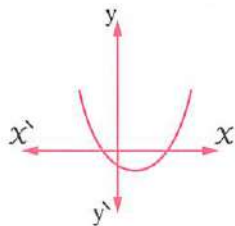
(d)  $x^2 + 4x + 1 = 0$

**28** Each of the following figures represents the curve of the function  $f$  :

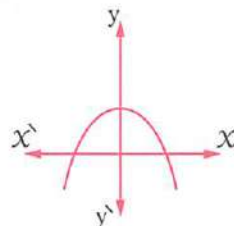
$f(x) = ax^2 + bx + c$  which of these figures does have  $b^2 - 4ac = 0$



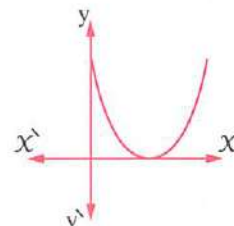
(a)



(b)



(c)



(d)

## Second Essay questions

Answer the following questions :

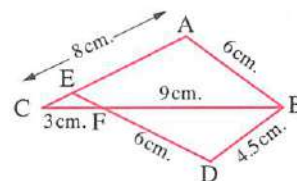
**1** In the opposite figure :

$\overline{BC} \cap \overline{DE} = \{F\}$  ,  $AB = 6$  cm. ,  $BC = 12$  cm. ,  $AC = 8$  cm.

,  $FC = 3$  cm. ,  $BD = 4.5$  cm. ,  $DF = 6$  cm. **Prove that :**

[1]  $\triangle ABC \sim \triangle DBF$

[2]  $\triangle EFC$  is isosceles.



**2** If  $\sin \theta = \sin 750^\circ \cos 300^\circ + \sin (-60^\circ) \cot 120^\circ$  where  $0^\circ < \theta < 360^\circ$

**Find :**  $\theta$

**3** Determine the sign of the function  $f : f(x) = x^2 - x + 12$  and hence determine in  $\mathbb{R}$  the solution set of the inequality :  $x^2 + 12 > x$  , represent the solution on the number line.

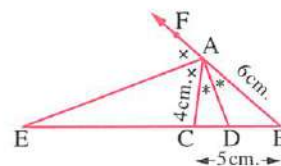
**4** In the opposite figure :

In  $\triangle ABC$  :  $AB = 6$  cm. ,  $AC = 4$  cm. ,  $BC = 5$  cm.

,  $\overline{AD}$  bisects  $\angle BAC$  and intersects  $\overline{BC}$  at  $D$

,  $\overline{AE}$  bisects  $\angle A$  externally and intersects  $\overline{BC}$  at  $E$

**Calculate :** The length of  $\overline{DE}$

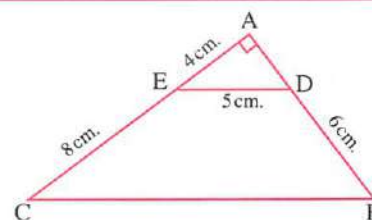


**5** In the opposite figure :

$ABC$  is a right-angled triangle at  $A$

[1] **Prove that :**  $\overline{DE} \parallel \overline{BC}$

[2] **Find the length of :**  $\overline{BC}$



## Model

8

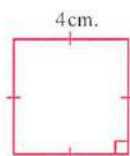
Interactive test 8



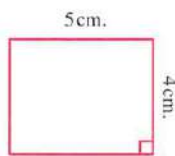
## First Multiple choice questions

Choose the correct answer from the given ones :

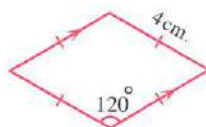
1 Which of the following polygons are similar ?



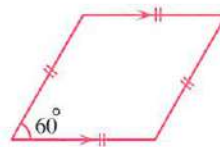
[1]



[2]



[3]



[4]

- (a) The two polygons [1] , [2]                      (b) The two polygons [1] , [3]  
 (c) The two polygons [3] , [4]                      (d) The two polygons [2] , [4]

2 If the terminal side of a positive angle  $(90^\circ - \theta)$  in standard position intersects the unit circle at point  $(-\frac{3}{5}, \frac{4}{5})$ , then  $\sin(90^\circ - \theta) = \dots\dots\dots$

- (a)  $-\frac{3}{5}$                       (b)  $\frac{3}{5}$                       (c)  $-\frac{4}{5}$                       (d)  $\frac{4}{5}$

3 The function  $f : f(x) = 4 - 2x$  is non-positive if  $\dots\dots\dots$

- (a)  $x > 2$                       (b)  $x < 2$                       (c)  $x \geq 2$                       (d)  $x \leq 2$

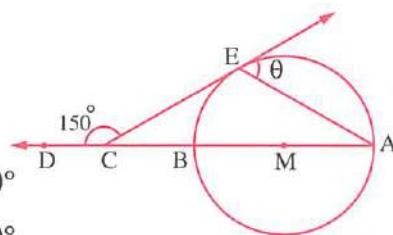
4 The measure of the central angle subtends an arc of length  $\pi$  cm. in a circle with diameter length 8 cm. equals  $\dots\dots\dots$

- (a)  $\frac{\pi}{8}$                       (b)  $\frac{\pi}{4}$                       (c)  $\frac{2\pi}{3}$                       (d)  $2\pi$

5 In the opposite figure :

If  $\overrightarrow{CE}$  is a tangent to the circle  
 , then  $\theta = \dots\dots\dots$

- (a)  $45^\circ$                       (b)  $50^\circ$   
 (c)  $55^\circ$                       (d)  $60^\circ$

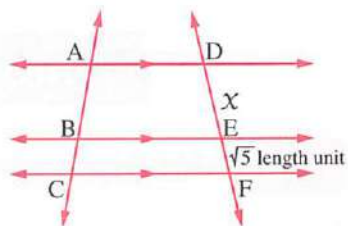


6 The quadratic equation whose terms coefficients are real numbers and one of its roots is  $(3 - i)$  is  $\dots\dots\dots$

- (a)  $x^2 - 6x - 10 = 0$                       (b)  $2x^2 + 6x + 10 = 0$   
 (c)  $x^2 - 6x + 10 = 0$                       (d)  $x^2 + 6x + 10 = 0$

**7 In the opposite figure :**

If  $A(0, 6)$ ,  $B(-2, 2)$  and  $C(-3, 0)$ ,  $\overrightarrow{AD} \parallel \overrightarrow{BE} \parallel \overrightarrow{CF}$ ,  
 $EF = \sqrt{5}$  length unit, then  $X = \dots\dots\dots$  length unit.



- (a)  $\sqrt{5}$  (b)  $2\sqrt{5}$   
 (c)  $3\sqrt{5}$  (d)  $4\sqrt{5}$

**8** If  $\cos \theta = \frac{3}{5}$ ,  $0^\circ < \theta < 90^\circ$ , then  $\sin(90^\circ - \theta) = \dots\dots\dots$

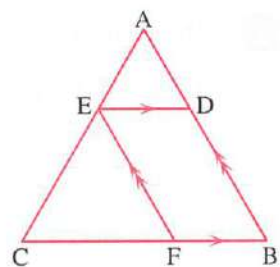
- (a)  $\frac{3}{4}$  (b)  $\frac{5}{3}$  (c)  $\frac{3}{5}$  (d)  $\frac{4}{5}$

**9** The function  $f : f(\theta) = \sin(b\theta)$  is a periodic function and its period  $\left(\frac{2\pi}{3}\right)$ , then  $b = \dots\dots\dots$

- (a)  $\frac{1}{2}$  (b)  $\frac{1}{3}$  (c) 3 (d) 6

**10 In the opposite figure :**

If  $\overline{DE} \parallel \overline{BC}$ ,  $\overline{EF} \parallel \overline{AB}$ ,  $\frac{AD}{DB} = \frac{2}{3}$ ,  
 then  $\frac{\text{area}(\square DBFE)}{\text{area}(\triangle ABC)} = \dots\dots\dots$



- (a)  $\frac{21}{25}$  (b)  $\frac{16}{25}$   
 (c)  $\frac{12}{25}$  (d)  $\frac{13}{25}$

**11** If  $4x + 2yi = 8 + 4xi$ , then  $x + y = \dots\dots\dots$

- (a) -2 (b) 5 (c) 6 (d) 4

**12** If  $x = 4$  is one of the roots of the equation  $x^2 + mx = 4$ , then  $\dots\dots\dots$

- (a)  $m = -3$  (b)  $m$  is an even.  
 (c)  $(1 - m)$  is a perfect square. (d) (a), (c) are true.

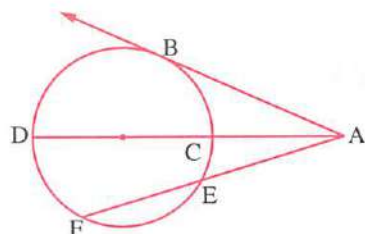
**13** The sum of integers belong to the solution set of the inequality  
 $(x - 2)(3x - 1) \leq 0$  equal  $\dots\dots\dots$

- (a) -1 (b) 1 (c) 2 (d) 3

**14 In the opposite figure :**

All the following mathematical  
 expressions are true except  $\dots\dots\dots$

- (a)  $(AB)^2 = AC \times AD$  (b)  $(AB)^2 = AE \times AF$   
 (c)  $AC \times AD = AE \times AF$  (d)  $AC \times CD = AE \times EF$



**15 In the opposite figure :**

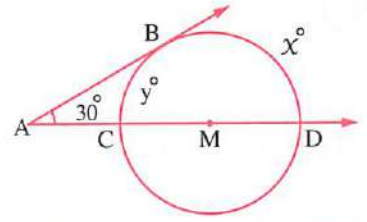
$$x^2 - y^2 = \dots\dots\dots$$

(a)  $30 \times 180$

(b)  $180 \times 60$

(c) 60

(d) 150

**16 In the opposite figure :**

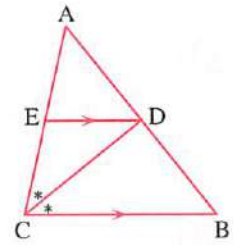
$$\frac{AE}{EC} = \dots\dots\dots$$

(a)  $\frac{DE}{BC}$

(b)  $\frac{AD}{AB}$

(c)  $\frac{AC}{CB}$

(d)  $\frac{AB}{BC}$

**17 In the opposite figure :**

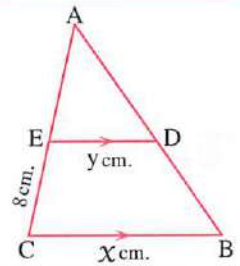
If  $\frac{x-y}{x+y} = \frac{2}{7}$ , then AE = ..... cm.

(a) 16

(b) 15

(c) 12

(d) 10

**18 The diameter of circle M is 6 cm. ,  $P_M(B)$  = zero , then B lies .....**

(a) inside the circle.

(b) outside the circle.

(c) on the circle.

(d) at the centre of the circle.

**19 If  $(L - 2)$  ,  $(M - 2)$  are roots of the equation :  $x^2 - 4x - 4 = 0$  , then  $L^2 - 8L + 5 = \dots\dots\dots$** 

(a) 3

(b) -3

(c)  $\pm 3$

(d) zero

**20 In the opposite figure :**

$$\triangle ABC \sim \triangle AED$$

If AD = 3 cm. , BD = 2 cm. , AE = 2.5 cm.

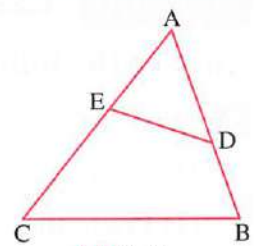
, then EC = ..... cm.

(a) 2.5

(b) 3

(c) 4.5

(d) 3.5

**21 The sum of the areas of two similar polygons is  $225 \text{ cm}^2$  and the ratio between their perimeters 4 : 3 , then the area of the greater polygons. = .....  $\text{cm}^2$** 

(a) 81

(b) 144

(c)  $128 \frac{4}{7}$

(d)  $96 \frac{3}{7}$

**22** The function  $f$  where  $f(x) = 2 - x$  is non-negative when  $x \in \dots\dots\dots$

- (a)  $]-\infty, 2]$  (b)  $]-\infty, 2[$  (c)  $[2, \infty[$  (d)  $]2, \infty[$

**23**  $\tan\left(-\frac{14}{3}\pi\right) = \dots\dots\dots$

- (a)  $-\sqrt{3}$  (b)  $\sqrt{3}$  (c)  $\frac{1}{\sqrt{3}}$  (d)  $-\frac{1}{\sqrt{3}}$

**24** If  $P_M(A) = r$ , then A lies  $\dots\dots\dots$  "where  $r$  is the radius length of the circle M"

- (a) on the circle (b) outside the circle  
(c) inside the circle (d) at the centre of the circle

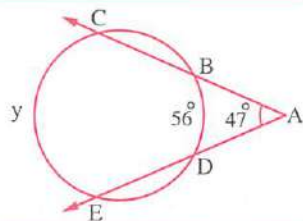
**25** If  $\sin A = \frac{1}{2}$ , then the least positive angle satisfies this trigonometric equation is  $\dots\dots\dots$

- (a)  $150^\circ$  (b)  $30^\circ$  (c)  $60^\circ$  (d)  $330^\circ$

**26** In the opposite figure :

$y = \dots\dots\dots$

- (a)  $90^\circ$  (b)  $140^\circ$   
(c)  $150^\circ$  (d)  $160^\circ$



**27** If L, M are the two roots of the equation :  $x^2 - 7x + 3 = 0$ , then  $L^2 + M^2 = \dots\dots\dots$

- (a) 7 (b) 43 (c) 58 (d) 79

**28** The two roots of the equation :  $x(x - 2) = 5$  are  $\dots\dots\dots$

- (a) two complex and non real roots. (b) two equal real roots.  
(c) two different real roots. (d) 2 and zero.

## Second Essay questions

Answer the following questions :

**1** ABCD is a rectangle in which  $AB = 6$  cm. ,  $BC = 8$  cm.

Draw  $\overrightarrow{BE} \perp \overrightarrow{AC}$  to intersect  $\overrightarrow{AC}$  at E ,  $\overrightarrow{AD}$  at F

[1] Prove that :  $(AB)^2 = AF \times AD$

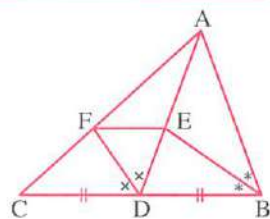
[2] Find : The length of  $\overrightarrow{AF}$

**2** In the opposite figure :

In  $\triangle ABC$  , D is a midpoint of  $\overrightarrow{BC}$

,  $AB = AD$  ,  $\overrightarrow{BE}$  bisects  $\angle B$  ,  $\overrightarrow{DF}$  bisects  $\angle ADC$

Prove that :  $\overrightarrow{EF} \parallel \overrightarrow{BC}$



**3** Find the general solution of the equation :  $\csc 6\theta = \sec 3\theta$

**4** Prove that the roots of the equation :  $7x^2 - 11x + 5 = 0$  are non real conjugate , then find these two roots by using the general formula.

**5** ABC is a triangle ,  $D \in \overline{BC}$  where  $BD = 5$  cm. and  $DC = 4$  cm. If  $AC = 6$  cm. , prove that :

[1]  $\overline{AC}$  is a tangent segment to the circle passing through the points A , B and D

[2]  $\triangle ACD \sim \triangle BCA$

[3] Area of  $(\triangle ABD)$  : Area of  $(\triangle ABC) = 5 : 9$

**Model**

**9**

Interactive test **9**



### First Multiple choice questions

Choose the correct answer from the given ones :

**1** The sign of the function  $f$  where  $f(x) = 6 - 2x$  is positive if .....

(a)  $x > 3$

(b)  $x \geq 3$

(c)  $x < 3$

(d)  $x = 3$

**2** In the opposite figure :

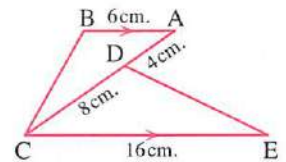
If  $\overline{AB} \parallel \overline{EC}$  , then  $\frac{ED}{BC} = \dots\dots\dots$

(a)  $\frac{4}{3}$

(b)  $\frac{3}{4}$

(c)  $\frac{2}{3}$

(d)  $\frac{1}{2}$



**3** If  $\cot(90^\circ - \theta) = \cot 2\theta$  where  $0^\circ < \theta < 90^\circ$  , then  $\sin 3\theta = \dots\dots\dots$

(a)  $-1$

(b) zero

(c)  $1$

(d)  $\frac{1}{2}$

**4** In the opposite figure :

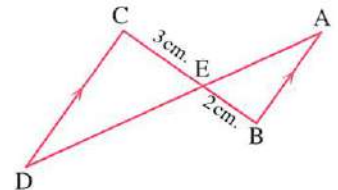
$\overline{AB} \parallel \overline{CD}$  ,  $BE = 2$  cm. ,  $CE = 3$  cm. ,  $AD = 10$  cm. , then  $AE = \dots\dots\dots$  cm.

(a)  $4$

(b)  $6$

(c)  $2$

(d)  $3$



**5** In the opposite figure :

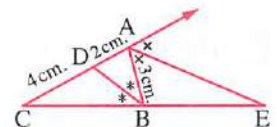
$BE = \dots\dots\dots$  cm.

(a)  $6$

(b)  $8$

(c)  $9$

(d)  $10$



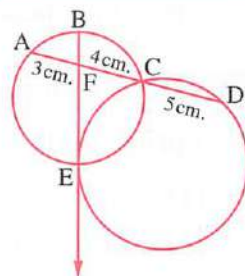
6  $\cos (90^\circ - \theta) \times \csc \theta = \dots\dots\dots$

- (a) zero (b) 1 (c) -1 (d)  $\cot \theta$

7 In the opposite figure :

Two intersecting circles at C , E ,  $\overrightarrow{BE}$  touches the larger circle at E  
If AF = 3 cm. , FC = 4 cm. , CD = 5 cm. , then BE = ..... cm.

- (a) 9 (b) 8  
(c) 7 (d) 6



8 If the terminal side of an angle of measure  $30^\circ$  in standard position rotates three and half revolutions clockwise then the terminal side lies in the ..... quadrant.

- (a) first (b) second (c) third (d) fourth

9 The number of intersections between the curve

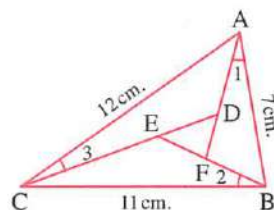
$y = \sin 3x$  with  $x$ -axis in the interval  $[0, 2\pi]$  equals .....

- (a) 2 (b) 3 (c) 4 (d) 7

10 In the opposite figure :

If  $m(\angle 1) = m(\angle 2) = m(\angle 3)$   
, then DE : EF : FD = .....

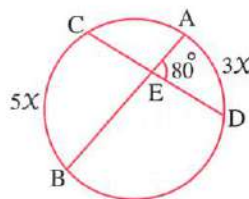
- (a) 7 : 11 : 12 (b) 12 : 11 : 7  
(c) 12 : 7 : 11 (d) 11 : 12 : 7



11 In the opposite figure :

$x = \dots\dots\dots$

- (a)  $10^\circ$  (b)  $20^\circ$   
(c)  $30^\circ$  (d)  $40^\circ$



12 If  $\sec 3\theta = 2$  where  $\theta$  is an acute angle , then  $\theta = \dots\dots\dots$

- (a)  $10^\circ$  (b)  $15^\circ$  (c)  $20^\circ$  (d)  $30^\circ$

13 The interior bisector at a vertex of a triangle ..... the exterior bisector at this vertex.

- (a) parallel (b) perpendicular to  
(c) equal (d) coincide with

- 14 If  $L, M$  are the two roots of the equation :  $X^2 - 5X - 6 = 0$

the numerical value of the expression :  $L^2 - 5L + 3 = \dots\dots\dots$

- (a) -6 (b) 6 (c) 9 (d) 3

- 15 Two similar polygons are congruent if their scale factor of similarity equals .....

- (a)  $\frac{1}{2}$  (b) 1 (c) more than 1 (d) less than 1

- 16 If a  $X^2 + bX + c = 0$ ,  $a, b$  and  $c$  are real numbers and  $(b^2 - 4ac)$

is not positive, then the roots of the equation are .....

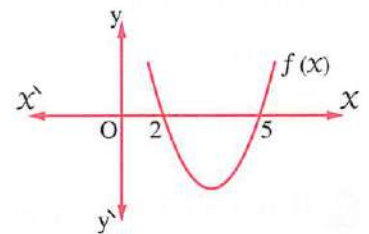
- (a) equal. (b) not real.  
(c) conjugate complex. (d) real different.

- 17 In the opposite figure :

$f(X) = aX^2 + bX + c$

, then  $\frac{b+c}{a} = \dots\dots\dots$

- (a) 3 (b) 5  
(c) 7 (d) 10

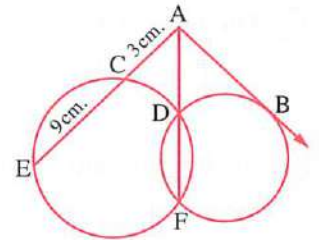


- 18 In the opposite figure :

If  $AC = 3$  cm. ,  $CE = 9$  cm.

, then  $AB = \dots\dots\dots$  cm.

- (a) 27 (b) 36  
(c) 9 (d) 6



- 19 The simplest form of the imaginary number  $i^{-18} = \dots\dots\dots$

- (a) 1 (b) -1 (c) -i (d) i

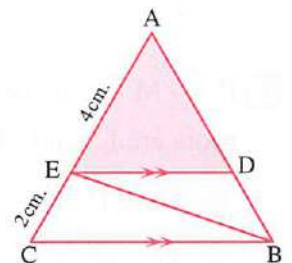
- 20 In the opposite figure :

If  $\overline{DE} \parallel \overline{BC}$  and the area

of  $(\Delta EBC) = 9 \text{ cm}^2$

, then the area of  $(\Delta ADE) = \dots\dots\dots \text{ cm}^2$

- (a) 6 (b) 12  
(c) 18 (d) 27



- 21** The measure of an inscribed angle is  $60^\circ$  subtended by an arc of length  $4\pi$  cm.  
 , then the circumference of the circle = ..... cm.

(a)  $24\pi$  (b)  $12\pi$  (c)  $6\pi$  (d)  $18\pi$

- 22** In the opposite figure :

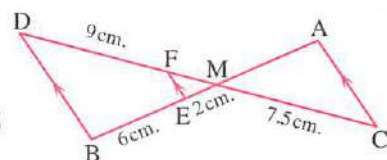
MF + AM = ..... cm.

(a) 11

(c) 6

(b) 7.5

(d) 8



- 23** In the opposite figure :

$\overline{AB}$  is a common tangent to the two circles at B

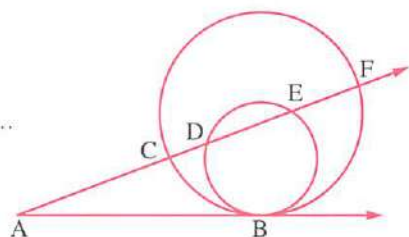
and  $\overline{AF}$  is a secant to both of them , then  $(AB)^2 = \dots\dots\dots$

(a)  $AC \times CD$

(b)  $AD \times AE$

(a)  $AD \times DF$

(d)  $AC \times CF$



- 24** If the roots of the equation :  $4x^2 - 12x + m = 0$  are equal , then  $m = \dots\dots\dots$

(a) 3

(b) 4

(c) 9

(d) 16

- 25** The sign of  $f : f(x) = -2x$  is positive in the interval .....

(a)  $]-\infty, \infty[$

(b)  $\mathbb{R} - \{2\}$

(c)  $]-\infty, 2]$

(d)  $]-\infty, 0[$

- 26** In the opposite figure :

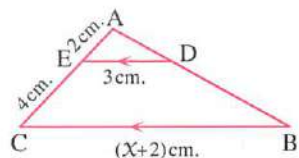
$x = \dots\dots\dots$

(a) 5

(c) 7

(b) 6

(d) 8



- 27** If L , M are the two roots of the equation :  $x^2 + x + 1 = 0$  , then  $L + M + LM = \dots\dots\dots$

(a) zero

(b) 1

(c) -1

(d) 2

- 28** If L , M are the two roots of the equation :  $x^2 - 5x + 7 = 0$  , then the equation whose two roots are  $L^2$  and  $M^2$  is .....

(a)  $x^2 + 11x + 49 = 0$

(c)  $x^2 - 49x + 11 = 0$

(b)  $x^2 - 11x + 49 = 0$

(d)  $x^2 + 11x - 49 = 0$

## Second Essay questions

Answer the following questions :

- 1 Without using calculator find the value of the following :

$$\sin 420^\circ \cos 330^\circ + \frac{\sin 15^\circ}{\sin 165^\circ} + \tan^2 65^\circ - \cot 25^\circ \tan 65^\circ$$

- 2 ABC is a triangle inscribed in a circle , D is a midpoint of  $\overline{BC}$  , draw  $\overrightarrow{AD}$  to intersect the circle at E

Prove that : [1]  $(BD)^2 = AD \times DE$

[2]  $\triangle EBD \sim \triangle CAD$

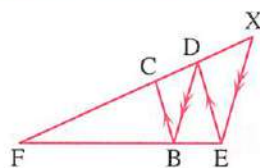
- 3 The perimeter of triangle ABC is 27 cm. , draw  $\overrightarrow{BD}$  bisects  $\angle B$  and intersect  $\overline{AC}$  at D , if  $AD = 4$  cm. ,  $CD = 5$  cm. Find the length of each :  $\overline{AB}$  ,  $\overline{BC}$  ,  $\overline{BD}$

- 4 If  $X = 2 + 3i$  ,  $y = \frac{3+i}{i}$  find the value of the expression :  $X^2 + 2XY + Y^2$

- 5 In the opposite figure :

$$\overline{ED} \parallel \overline{BC} , \overline{DB} \parallel \overline{EX}$$

$$\text{Prove that : } \left(\frac{FB}{FE}\right)^2 = \frac{FC}{FX}$$



Model

10

Interactive test 10



## First Multiple choice questions

Choose the correct answer from the given ones :

- 1 In the opposite figure :

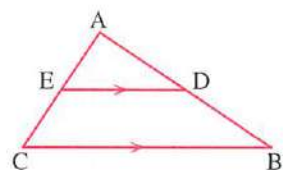
All the following mathematical expressions are true except .....

(a)  $\frac{AD}{DB} = \frac{AE}{EC}$

(b)  $\frac{AD}{DB} = \frac{DE}{BC}$

(c)  $\frac{AD}{AB} = \frac{AE}{AC}$

(d)  $\frac{AB}{BD} = \frac{AC}{EC}$



- 2 If  $\sin \alpha = \cos \beta$  where  $\alpha$  ,  $\beta$  are two acute angles , then  $\tan (\alpha + \beta) = \dots\dots\dots$

(a)  $\frac{1}{\sqrt{3}}$

(b) 1

(c)  $\sqrt{3}$

(d) undefined.

- 3 The smallest value of the function  $f$  , where  $f(\theta) = 3 \cos (2\theta)$  is .....

(a) -6

(b) -3

(c) -2

(d) -1

**4 In the opposite figure :**

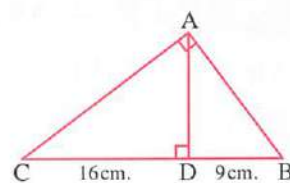
The length of  $\overline{AB}$  = ..... cm.

(a) 12

(b) 15

(c) 20

(d) 25



**5 In the opposite figure :**

If  $\overline{ED} \parallel \overline{BC}$ ,  $m(\angle ADY) = m(\angle FDY)$

and  $ED = 10$  cm.,  $BD = 15$  cm.

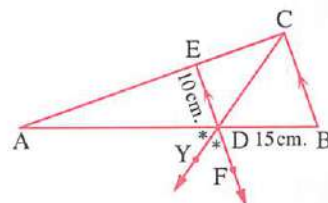
, then  $AD$  = ..... cm.

(a) 20

(b) 25

(c) 30

(d) 45



**6 The equation whose roots are  $(2 + 3i)$ ,  $(2 - 3i)$  is .....**

(a)  $x^2 + 4x + 13 = 0$

(b)  $x^2 - 4x + 13 = 0$

(c)  $x^2 + 4x - 13 = 0$

(d)  $x^2 - 4x - 13 = 0$

**7  $(1 - i)^{12}$  = .....**

(a)  $-64i$

(b)  $64i$

(c)  $-64$

(d)  $64$

**8 If the scale factor of similarity of the polygon  $P_1$  to the polygon  $P_2$  is  $\frac{2}{3}$  and scale factor of similarity of the polygon  $P_3$  to the polygon  $P_2$  is  $\frac{1}{3}$ , which of the following relations is correct ?**

(a)  $\text{Area}(P_1) + \text{Area}(P_2) = \text{Area}(P_3)$

(b)  $\text{Area}(P_1) + \text{Area}(P_3) = \text{Area}(P_2)$

(c)  $\sqrt{\text{Area}(P_1)} + \sqrt{\text{Area}(P_2)} = \sqrt{\text{Area}(P_3)}$

(d)  $\sqrt{\text{Area}(P_1)} + \sqrt{\text{Area}(P_3)} = \sqrt{\text{Area}(P_2)}$

**9 In the opposite figure :**

If  $\overrightarrow{DA}$ ,  $\overrightarrow{DB}$  are tangents to

the circle at A and B respectively

,  $DA = DB = 8$  cm.,  $BC = 2$  cm.

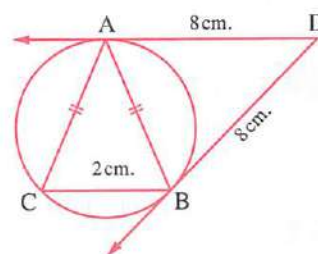
, then  $AC$  = ..... cm.

(a) 3

(b) 4

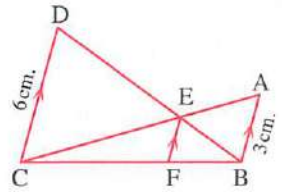
(c) 5

(d) 6

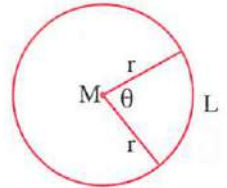


**10 In the opposite figure :**If  $\overline{AB} \parallel \overline{EF} \parallel \overline{CD}$ , then  $EF = \dots\dots\dots$  cm.

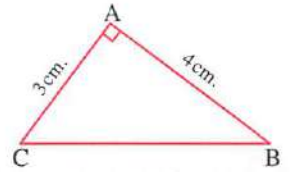
- (a) 2.5 (b) 2  
(c) 1.5 (d) 1

**11 In the opposite figure :** $\theta^{\text{rad}} = \dots\dots\dots$ 

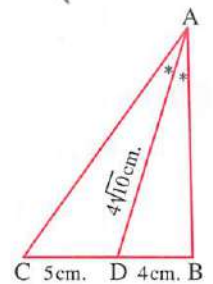
- (a)  $\frac{L}{r}$  (b)  $\frac{r}{L}$   
(c)  $r \times L$  (d)  $L \times 2r$

**12 In the opposite figure :** $m(\angle ABC) = \dots\dots\dots$ 

- (a)  $\sin^{-1}\left(\frac{3}{4}\right)$  (b)  $\sin^{-1}\left(\frac{4}{3}\right)$   
(c)  $\tan^{-1}\left(\frac{3}{4}\right)$  (d)  $\cot^{-1}\left(\frac{3}{4}\right)$

**13 In the opposite figure :**The perimeter of  $\triangle ABC = \dots\dots\dots$  cm.

- (a) 36  
(b) 32  
(c) 28  
(d) 24

**14 The roots of the equation :  $x^2 - 2\sqrt{5}x + 1 = 0$  are  $\dots\dots\dots$** 

- (a) rational real. (b) not real.  
(c) real equal. (d) irrational real.

**15 The sign of the function  $f : f(x) = x - 4$  where  $x \in ]4, \infty[$  is  $\dots\dots\dots$** 

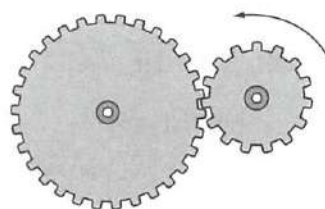
- (a) always positive.  
(b) always negative.  
(c) positive in the interval  $]4, 5[$  and negative in the interval  $]5, \infty[$   
(d) negative in the interval  $]4, 5[$  and positive in the interval  $]5, \infty[$

**16 In the opposite figure :**

If the greater gear revolves one revolution  
 , then the smaller gear revolves 3 revolution

If the smaller gear revolves one revolution  
 in the direction of the arrow shown on the figure

, then the central angle of revolving the greater gear is .....

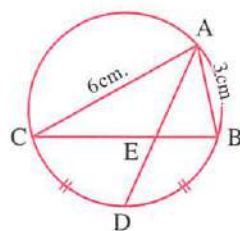


- (a)  $-\frac{\pi}{2}$  (b)  $-\frac{2\pi}{3}$  (c)  $\frac{2\pi}{3}$  (d)  $2\pi$

**17 In the opposite figure :**

$$\frac{BE}{BC} = \dots\dots\dots$$

- (a)  $\frac{1}{3}$  (b)  $\frac{1}{2}$   
 (c)  $\frac{2}{3}$  (d)  $\frac{3}{2}$



**18** The ratio between the length of two corresponding sides of two similar triangles is 1 : 4  
 , then the ratio between their areas is .....

- (a) 1 : 2 (b) 1 : 4 (c) 1 : 8 (d) 1 : 16

**19** If  $L \in \mathbb{R}$  ,  $M \in \mathbb{R}$  are the two roots of the equation :  $aX^2 + bX + c = 0$  where  $a > 0$  ,  $L < M$   
 , then the solution set of the inequality :  $aX^2 + bX + c < 0$  is .....

- (a)  $]-\infty, L[$  (b)  $]L, M[$  (c)  $]M, \infty[$  (d)  $\mathbb{R} - [L, M]$

**20** If one of the roots of the equation :  $4kX^2 + 7X + k^2 + 4 = 0$  is multiplicative inverse of  
 the other root , then  $k = \dots\dots\dots$

- (a)  $\pm 2$  (b) 3 (c) 4 (d) 2

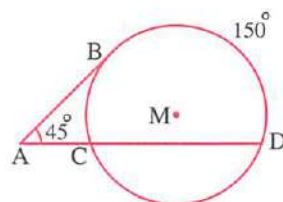
**21 In the opposite figure :**

$\overline{AB}$  is a tangent segment to circle M at B

,  $\overrightarrow{AC}$  intersects the circle at C , D

,  $m(\angle A) = 45^\circ$  ,  $m(\widehat{DB}) = 150^\circ$

, then  $m(\widehat{BC}) = \dots\dots\dots$



- (a)  $30^\circ$  (b)  $40^\circ$  (c)  $60^\circ$  (d)  $120^\circ$

- 22** In  $\triangle ABC$ ,  $AB = 8$  cm.,  $AC = 6$  cm.,  $D \in \overline{AB}$  such that  $AD = 3$  cm.,  $E \in \overline{AC}$  such that  $AE = 4$  cm. If the area of  $\triangle AED = 3$  cm<sup>2</sup>, then the area of the polygon DBCE = ..... cm<sup>2</sup>

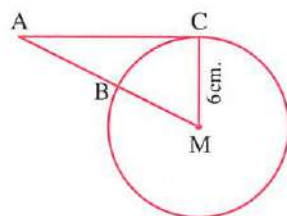
(a) 12 (b) 9 (c) 6 (d) 8

- 23** In the opposite figure :

$\overline{AC}$  touches the circle M at C,  $MC = 6$  cm.

,  $P_M(A) = 64$ , then  $AB =$  ..... cm.

(a) 3 (b) 4  
(c) 5 (d) 6



- 24** If  $\triangle ABC \sim \triangle XYZ$  and  $3 AB = 2 XY$ , then area of  $\triangle ABC$  : area of  $\triangle XYZ =$  .....

(a) 4 : 9 (b) 9 : 4 (c) 2 : 3 (d) 3 : 2

- 25** The angle of measure  $\left(\frac{7\pi}{6}\right)$  radian has degree measure = .....

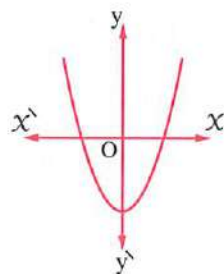
(a) 225° (b) 210° (c) 840° (d) - 225°

- 26**  $(1 + i)^{10} =$  .....

(a) 32 i (b) - 32 i (c) 32 (d) - 32

- 27** The opposite figure represents the curve of the function  $f : f(x) = ax^2 + bx + c$ , then which of the following is true ?

(a)  $a > 0$ ,  $c > 0$  (b)  $a > 0$ ,  $c < 0$   
(c)  $a < 0$ ,  $b > 0$  (d)  $a < 0$ ,  $c < 0$



- 28** If one of the two roots of the equation :  $x^2 + kx - 98 = 0$  is twice the additive inverse of the other root, then  $k =$  .....

(a)  $\pm 14$  (b)  $\pm 7$  (c)  $\pm 8$  (d) 49

## Second Essay questions

Answer the following questions :

**1** In the opposite figure :

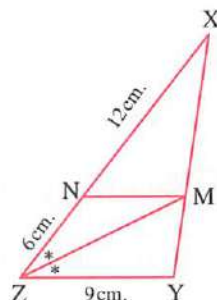
$$XN = 12 \text{ cm.}$$

$$, NZ = 6 \text{ cm.}$$

$$, YZ = 9 \text{ cm.}$$

,  $\overrightarrow{ZM}$  bisects  $\angle XZY$

**Prove that :**  $\overline{MN} \parallel \overline{YZ}$



**2** If  $5 \sin \theta - 3 = 0$ ,  $\frac{\pi}{2} < \theta < \pi$

**Find the value of :**  $\cos \left( \frac{\pi}{2} - \theta \right) + \sin (2\pi - \theta) - \cos \left( \frac{3\pi}{2} - \theta \right) + \cos \theta$

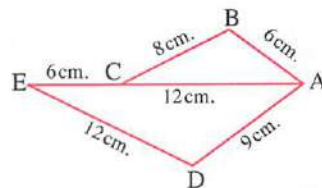
**3** In the opposite figure :

$$AB = 6 \text{ cm.}, BC = 8 \text{ cm.}, AC = 12 \text{ cm.}$$

$$, CE = 6 \text{ cm.}, AD = 9 \text{ cm.}, DE = 12 \text{ cm.}$$

**Prove that :**

$$[1] \triangle ABC \sim \triangle ADE \quad [2] \overline{AE} \text{ bisects } \angle BAD$$



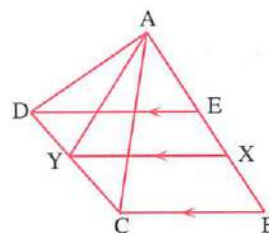
**4** Represent graphically the function  $f : f(x) = x^2 - 2x - 3$ , then determine the sign of the function.

**5** In the opposite figure :

$$\overline{ED} \parallel \overline{XY} \parallel \overline{BC}$$

$$\text{and } AD \times BX = AC \times EX$$

**Prove that :**  $\overline{AY}$  bisects  $\angle CAD$



# كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

